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*Illustrated.

In an editorial in its issue of November 27 entitled "What Is the Matter with the Railways and Regulation?" the *Railway Age Gazette* presented data showing that the

The Need for a Surplus

main trouble with regulation has been that it has been predicated on experience indicating that railway profits tend to increase, whereas since effective regulation was begun in 1906 economic forces have been at work which have tended to cause profits to decline. The same point is made in an entirely different way by John E. Oldham in his very interesting and able paper on "Railway Profits from the Investors' Point of View," most of which is published elsewhere in this issue. Not only does Mr. Oldham's paper show the tendency

of railway profits to decline relatively, even when total earnings increase, as in 1913, but it is an extraordinarily clear, logical and convincing exposition of the need for railways to earn a surplus, and of the effects produced on their credit when their surplus earnings decline. Mr. Oldham's paper is a remarkable and highly original study of the relations between railway earnings, expenses, return to capital, surplus and credit, and will be read with interest and profit by every person who takes a serious and intelligent interest in the subject of railway economics.

An interesting point brought out in the comparative dynamometer tests made between Consolidation and Mikado type locomotives on the Chicago & North Western, as described elsewhere in this issue, is the fact that with a small number of tests the true efficiency of a locomotive is not shown by comparing the ton-miles per

Comparative Locomotive Tests

pound of coal. In this instance the Consolidation tests were made with an average resistance of 4.091 lb. per ton, while the average for the Mikado engines was 3.817 lb. per ton in Test II and 4.006 lb. per ton in Test III, a difference of about 5 per cent. In computing the tonnage rating for locomotives when dynamometer cars are used, if this difference is not allowed for it may result in underrating the engines. No matter how much care is exercised in making comparative tests there are factors in train resistance that cannot be maintained constant. For this reason it is evident that when dynamometer cars are not used and ton-miles per pound of coal is taken as the comparing item, a large number of tests should be made so that any of the variable features will be more nearly an average for the two locomotives.

There are so many reasons why a railroad should store coal for its own individual use and why it should influence the dealers and consumers to store coal for their use that it is impossible to carefully cover the subject in a single editorial. Therefore, our effort here will be merely to point out briefly the advantages that may be obtained from the storage of coal by the railroads themselves.

Storage of Coal By Railroads

In the spring and summer months the demand for screenings, or the cheaper grades of fuel, greatly exceeds the demand for the larger sizes, which of course must be mined in order to get the screenings. In the fall and winter months the large sizes are in greater demand, which gives a surplus of the screenings. The actual cost of hauling coal is very much less in the warm weather than in the cold, and at that time there is much less coal purchased. In the colder months the coal traffic is very heavy, as the demands of the consumers then increase, and at the same time the actual cost of transportation increases. From this it is apparent that with the same rates the railroads can save money by hauling their own coal in the warm weather. It is also evident that if the railroads haul their coal when the traffic is light they can devote their equipment to the hauling of other revenue tonnage when the traffic is heavy. If a large part of the coal were moved when other traffic was light the car shortages which so often develop in the fall and winter months would be reduced or avoided, and the roads would find it possible to haul their annual traffic with a smaller number of cars. In connection with the question of the storage of coal arises the question of the deterioration of the coal in storage and the cost of rehandling. The deterioration that takes place in storage is believed to be over-estimated. Many roads have stored coal with success, while others have not. There is no question that the coal will slack and crumble to a greater or less extent, depending on the kind of coal, but with the opportunities of purchasing the larger coal at the storage seasons at a reduced price this trouble may be very largely avoided. The cost of handling is, of course, a subject that must be considered, but if all the conditions be taken into consideration it is believed that a method could be adopted that would not show a loss.

The coal producer will be benefited by coal storage, as it will enable him to have a more uniform market throughout the year, which in turn will reduce the cost of production and the price of coal. The private consumer will be benefited, as there will be less periodical congestion at the mines, the car shortage will not be so great and he will be able to get coal more readily when he needs it most. This subject was very thoroughly considered at the sixth annual convention of the International Railway Fuel Association, the papers and discussion being published in the proceedings of that association for this year. Other papers regarding the weathering, deterioration and spontaneous combustion of storage coal have been published from time to time by the University of Illinois and the Bureau of Mines.

THE SUSPENSION OF ADVANCES IN RATES

THE discussion which recent developments have started, of the exercise by the Interstate Commerce Commission of its authority to suspend advances in rates, will not be fruitful of the best possible results, unless it be carried on in the light of the history of our federal railway rate legislation. It should also be carried on with careful reference to the letter and spirit of the provisions conferring on the commission the authority to suspend rates. In view of the history of our rate legislation, and of the language of the provisions giving the suspension power, it can hardly be seriously denied that the commission has been abusing this power—and this regardless of its formal procedure in dealing with suspensions.

Those who have participated in the discussion of rate regulation since President Roosevelt started his agitation on that subject will recall that in the controversy preceding the passage of the Hepburn act it was always conceded, in the most express way, by the leading advocates of the act, that both as a matter of right and as a matter of public expediency the initiative in making rates should be left with the carriers. The railways rendered a public service, but their ownership was private. Therefore—so this reasoning ran—the managers for the owners had a right to determine what they would charge for the services they rendered, subject to interference by public authorities only when the rates fixed were excessive or unfairly discriminatory. Furthermore, it was conceded, the traffic managers of the railways, located in all parts of the country, and in touch with its multifarious conditions, would ordinarily know, better than any body of men at Washington could know, what rates ought to be made; and the competition between different railways and territories, and the desire to develop the largest possible traffic, ordinarily would impel the managers to make rates that were reasonable and best adapted to develop the country's industry and commerce, while at the same time securing for the railways fair profits. The Hepburn act was framed in conformity with this reasoning. It gave the commission only the authority to reduce rates already fixed by the railways after it had specifically found them to be unreasonable.

In 1910 the railways tried to make general advances in rates. The Mann-Elkins act, giving the commission power to suspend advance, was hurried through to head them off. Even in the excitement of the controversy preceding the passage of that act, however, the right of the railways ordinarily to initiate their rates, and the public expediency of permitting them ordinarily to do so, were not forgotten or ignored. The commission is not required by that act to suspend all proposed advances; in fact, it has never been required by the law to suspend the advance of a single rate. The law simply gives it the authority, *in the exercise of a sound discretion*, to suspend proposed advances. In addition, the Mann-Elkins act provides that in the case of an attack on any rate advanced after January 1, 1910, the burden of proving that the rate is reasonable shall be on the carrier. Many people think that the law requires the railways to prove the reasonableness of every *advance* made after January 1, 1910. This view is entirely erroneous. The law does not require them to prove the reasonableness of any *advance* whatever. It merely requires that when they have advanced a rate since January 1,

1910, or propose to advance one, they must show that the higher rate is or would be a reasonable rate; and if it is a reasonable rate—if it is not unfairly discriminatory or excessive per se—it is a lawful rate, whether it represents an advance of 5, or 100, or 1,000 per cent.

Manifestly, the commission should not exercise its power of suspension arbitrarily or capriciously. It should exercise it with a due regard to the developments which led up to the granting of the power, and to the avowals and intentions of those who drafted and passed the legislation conferring it as to the purposes which it was meant to accomplish and the way in which it should be administered. Now, nothing is made plainer by the discussions both inside and outside of Congress than that it was not the thought of those who advocated and passed the Mann-Elkins act that it would, to a great extent, reverse the policy of the Hepburn act and deprive the carriers of the initiative in fixing rates. Their right of initiative was to be abridged, but only to the smallest extent that might be clearly necessary to protect the rights of the public. The power of suspension was to be somewhat analogous to the power of the courts to issue injunctions, and was to be exercised only when failure to do so might cause irreparable harm to some interest. That the officers of the railways were ordinarily inspired by right motives, that it was ordinarily to the interest of their companies for them to make reasonable rates, and that they would ordinarily know a great deal better than anybody else what rates ought to be made, was still recognized and conceded. Furthermore, it was clearly recognized that to limit narrowly the initiative of the carriers in making rates would do them great and irreparable harm. As was repeatedly pointed out, if the carrier filed an unreasonable rate, and the commission let it go into effect, a shipper could complain and show its unreasonableness, and get reparation for all the time it was in effect. On the other hand, if the railway should publish an advanced rate, and the commission should suspend it, and the carrier should subsequently establish its reasonableness, the carrier could get no reparation, but would lose absolutely the difference between the old rate and the advanced rate during the period of suspension.

The spirit and intent of the law were and are plain. Have they been carried out by the commission? It seems clear that they have not been. The commission adopted a principle for its guidance which it stated in its annual report for 1912. This principle is, in brief, that when tariffs are filed carrying advances in rates which are of small consequence and which evidently have been made in the course of the minor readjustments of rates upward and downward which constantly become necessary in the ordinary course of business, the tariffs will not be suspended. But when tariffs are filed the evident purpose of which is to effect substantial advances they will be suspended. The law assumed that changes in rates initiated by the responsible managers of the railways, whether advances or reductions, would ordinarily be allowed to go into effect on the regular thirty days' notice, but the commission has adopted the practice of suspending practically all tariffs carrying material advances, thereby curtailing the carriers' right of initiative to an extent never contemplated by the law. The law, and those who advocated and passed it, assumed that the power of suspension would be exercised according to the sound discretion of the commission after careful deliberation in each case; but the commission has set up for the exercise of the suspension power, a purely arbitrary rule, the application of which constantly deprives the owners of railways of property rights that the law intended to recognize. What becomes of the recognized right of the managers of railways ordinarily to initiate their charges if every really *substantial* advance in rates is to be suspended? What becomes of the law's recognition of the fact that the officers of the railways ordinarily are prompted by good motives and ordinarily are the best judges of what rates they should make, if months of labor of numbers of the ablest railway traffic men in the country may be nullified by the mere stroke of a

pen at Washington? When, how and by whom are the railways to be compensated for unjust losses sustained by them as a result of the application of this arbitrary rule?

The situation would be bad enough if, after having thus abused its authority, the commission rendered decisions promptly in cases involving rates under suspension. But in many cases, especially those of importance, it does not do so. It disposed of the rehearing of the 5 per cent case with commendable promptness. But, as the public well knows, exactly the opposite must be said of its handling of the rate advance cases four years ago and the original 5 per cent case. And there are unconscionable delays in deciding other cases of which the public hardly hears at all. General statements regarding such matters are less instructive than specific examples, and, therefore we shall give one of the latter. The coal originating railroads leading into St. Louis and East St. Louis gave notice in January, 1913—just two years ago now—of an advance in coal rates from Illinois territory to the St. Louis group, effective on April 1, 1913. The commission suspended the tariffs until July 30, 1913, and later to January 30, 1914, when its statutory authority of suspension expired. The case was heard on December 1, 1913, and argued in February, 1914; and, at the request of the commission, on the ground that it was as yet unable to dispose of the case, the rates were further suspended until March 31, 1914. Then, on the ground that it could not decide the case before the summer recess the commission asked that the rates be further suspended until November 1, 1914, which also was agreed to. On still another request from the commission the rates were still further suspended until January 1, 1915; and now the commission has asked for another postponement to November 1, 1915! The railways are in no position to refuse such requests of the commission for the voluntary postponement of advances as were made in this case, and as are made in many others. If the commission should decide that these advanced coal rates are reasonable, the railways, because of its incapacity to keep up with its work, will have been deprived for three years of their right to charge reasonable rates, and will have suffered an irreparable loss amounting to many hundreds of thousands.

While rates are under suspension, while the commission delays to decide the cases involving them, not only the railway industry, but a large part of all the industries in the country wait upon it. And one of the worst features of the situation is that the commission does not seem to realize the results its delays are causing, and is therefore not asking Congress to grant it the means imperatively needed for facilitating its work and putting it on a businesslike basis.

The *Railway Age Gazette* opposed the provisions giving the commission authority to suspend advances in rates because we apprehended—and predicted—that it would lead to the very abuses and results to which it has led. It is still our opinion that the provision is indefensible on any sound ground whatever—that it imposes a restriction on the exercise of the railway manager's right to initiate rates, which is wholly unjust and inexpedient. Bad as the law is, however, the intention of those who passed it was not so bad, and if the commission would use in its administration the businesslike methods and sound discretion it was intended it should use, the harm done would be comparatively small. Unfortunately, the commission has thus far exercised its discretion in disregard of the intent of the law, and with the greatest injustice and unwisdom; and the effects on the railway business and business in general have been what might have been expected.

Perhaps if railway officers will present the conditions to the commission in its true light, and insist on a modification of its policy it will do something to relieve the situation. There is evidence that some members of the commission realize that the policy it has been pursuing is wrong. If the railways cannot secure a great change in the administration of the suspension provision they should appeal to the courts or begin a nation-wide campaign for its entire repeal. The law gives the commission no authority to order an advance, or to suspend a reduction in

any rate; it is thus a wholly one-sided law; and as long as this is the case, for the commission to exercise its authority to order reductions in rates, and go on exercising its power of suspending advances proposed by the carriers as it has been doing, can spell only injustice and disaster. "This power (of suspending rates)" said the chairman of the commission in his dissenting opinion in the 5 per cent case, "is exercised, in my judgment, with unnecessary frequency, in view of the opportunity that shippers have of testing the reasonableness of increased rates, upon formal complaint filed with the commission; and, in my judgment, the Congress never intended so free a use of it when the power to suspend rates was granted to us." Let us hope that the other members of the commission will also come to see this subject in its true light.

THE ALL-AROUND SUPERINTENDENT

THE ambitious young man who believes that he is fit for promotion, but who sees others placed ahead of him, does some energetic thinking. He has forced upon his mind an important subject which cannot be thrust aside. Some thinking of this kind which a correspondent has put on paper, is printed in another column. He has not gone into the subject very deeply, and the brief essay that he has sent is laid before the reader in this way as a suggestion for further study.

Everybody knows about the evils of nepotism; the only remedy for that little vice is to engage in fasting and prayer for the enlightenment of the manager who pursues such a shortsighted policy. The other difficulty, the bringing in of men from other roads, is not so easily disposed of. A manager who does this from a mere selfish desire to save himself work is about as bad as the nepotist; but if, on the other hand, his fault is defective judgment of men, the only recourse of the aggrieved despatcher is to make his own merits so plainly apparent that the duller or most distant manager will hear of them. This means hard work; assiduous study of superintendents' problems day and night—especially night. In other words, the study of the application of general principles to particular questions arising on your own division, balancing the relative virtues of one superintendent's way of solving such questions against another's way, deciding what you yourself would do, and how you would convince your boss that you were right—these things are enough to absorb all of one's surplus energy throughout the waking hours of the day.

Our friend's letter has little or nothing to say about other qualifications than experience. But experience does not always blossom out in versatility. One of the most noticeable mistakes among superintendents is the habit of continuing to live mostly in the department from which they came. A master mechanic sometimes retains such an absorbing love for locomotives that, when dealing with roadway matters or public relations, he makes a poor superintendent. The superintendent who has been trainmaster at a freight terminal sometimes seems to ignore his duties in relation to fastidious passengers in parlor cars. Cannot the anxious despatcher take a hint from these examples? If he has got well saturated with train-operation ideas, let him question himself as to his qualifications in other lines; as an after-dinner speaker at a meeting of aldermen, for instance. The superintendent who knows how to interview a congressman, successfully, has a great advantage, at times. The train despatcher who wishes to qualify for such a function must do something besides perfect himself as an efficient lieutenant to the superintendent *on the road*. Off the road, perhaps at a farmer's house, ten miles away, may be at times an important field.

In short, the despatchers are sometimes left behind for what, to the manager, seem very good reasons. They are competent to handle men and to manage trains, but they are not all-around men. The manager may, indeed, have poor success in going outside for new men; but the best way to cure him of this bad habit will be to convince him that he will be successful inside his own organization. The efficient despatcher, aspiring to advancement, must constantly study outside his own immediate field. Dealing

with men—and women—of all sorts is an important art for the superintendent, and one in which it is scarcely possible to become too skilful.

Another common mistake of men who are promoted to a superintendency, with a 50 per cent increase above their former pay, is in raising the standard of their hats and their neckties faster than they improve the things under their hats and cravats—their brains and hearts. The superintendent must, indeed, be a gentleman, and we mean no slur on new hats or neat clothes; but a sudden transition in those outward things, when, at the same time, observers notice a far less marked improvement in the quality of the man's work, is likely to make an unfavorable impression. Perhaps the idea may be better put by saying that the despatcher should cultivate the qualities of a gentleman very carefully for some years before he gets his promotion. Not that he should wear a silk hat to the office, or run in debt for better coats than he can afford; but there is real sense in Napoleon's idea of the marshal's baton in the private soldier's knapsack. The division superintendent's job is in some senses the biggest one on the road, and the man who aspires to fill such a job well during the first year, should do a good deal of rehearsing, in the privacy of his own breast, for a long time beforehand—and a great variety of rehearsing.

The foregoing paragraphs cannot be called a sure rule for success; there is no such rule, for despatchers, any more than for other classes; but the despatcher who follows the suggestions will have the satisfaction of having taken a good step toward doing his part.

MISSOURI, KANSAS & TEXAS

UNTOWARD and extraordinary circumstances decreased the Missouri, Kansas & Texas' revenues by about \$775,000 in the fiscal year ended June 30, 1914, and increased operating expenses by \$1,281,000. In addition, reductions in passenger and freight rates caused a further loss in revenue of \$841,500. The company finished the year with but \$539,000 over and above expenses and interest charges, which is a decrease from the previous year of \$1,778,000; but had it not been for the extraordinary circumstances and the reductions in rates, the year's operations would have shown a substantially larger net income than in 1913, the net instead of being a little over \$500,000 would have been something over \$3,000,000. The untoward circumstances were severe droughts during growing time for grain and forage crops and unprecedented floods about the time of the maturity of the cotton crop.

Notwithstanding the disheartening interference with the freight business and the serious and costly interruption of train movement, operating results show up so remarkably well that it is easy to imagine how bitter the disappointment was that these operating results could not be reflected in net available for dividends.

The 40 Mikado locomotives which the Katy bought in 1913 were in service during the entire year under review. The total ton-miles of revenue freight handled amounted to 1,851,000,000 in 1914, an increase over 1913 of 1.1 per cent. The floods, the interruption to the seasonal movement of traffic and the movement of foreign cars empty being returned to their home lines, which latter was general all over the country, caused an increase in the empty car mileage of 5.4 per cent. Nevertheless, the trainload increased from 287 tons to 316 tons, or 10 per cent, and the tons per locomotive from 271 tons to 304 tons, or over 12 per cent. To accomplish this gain in average trainloading in the face of the larger empty car movement, the average number of empty cars per train north and east increasing by 10.5 per cent, and south and west by 21.3 per cent, is an accomplishment worthy of note. The gain in work done by locomotives is therefore greater than the 12 per cent indicated by the increased trainloading.

The Missouri, Kansas & Texas operates 3,825 miles of road, of which more than 1,000 miles is in Texas. One serious drawback to the economical operation of the system as a whole has

been the attitude of the Texas public and the Texas laws in regard to the portion of the system operated in that state. Various suits had been brought against the company in connection with the ownership of the Texas company's stock, the lease of other lines in Texas, etc.; but in February, 1914, an agreed judgment was arrived at between the attorney general of Texas, the company and the courts, which disposes finally, it is thought, of the question which had been raised by the Texas authorities and permits a consolidation of operations which should be of lasting benefit both to the company and the public served.

Even in the difficult year ended June 30, 1914, considerable progress was made in the program which the present management of the Missouri, Kansas & Texas is engaged on of betterment of the property. The expenditures for additions and betterments, exclusive of new equipment, amounted to \$1,232,000. Of this amount \$291,000 was spent for ballast, new ballast being applied to 143 miles of track. In this connection, although, of course, it is a maintenance expenditure and not chargeable to capital account, it should be mentioned that 146 miles was re-ballasted. The condition of the Texas lines in regard to ballast two years ago was far from satisfactory. Considerable expenditures will be required to put sufficient ballast on these lines to make them meet in this particular the general standard which has been adopted. During the year 100 miles of new 85-lb. rail was laid to replace lighter rail in main line. Included in the additions and betterments is an expenditure of \$246,000 for station buildings and fixtures. This, of course, is indicative rather of the efforts which are being made to please the communities served by the road than of progress in the policy of strengthening the plant to permit of more economical operation, but it is none the less interesting.

A detailed study of expenses in 1914 is not indicative of what might be expected under normal conditions. Total operating expenses amounted to \$22,722,000, a decrease, as compared with 1913, of \$86,000. The following table shows the proportion of each class of operating expenses to total operating revenues:

	1914	1913
Maintenance of way and structures.....	14.52	14.33
Maintenance of equipment.....	12.48	12.68
Traffic expenses.....	2.34	2.33
Transportation expenses.....	38.89	37.90
General expenses.....	3.86	3.27
Total.....	72.09	70.51

Maintenance of way cost \$4,575,000, or very slightly less than in the year before, a large decrease in the cost of tie renewals being offset by increases in the expenditures for roadway and track labor, bridges, roadway tools and maintenance of joint facilities.

Maintenance of equipment cost \$3,934,000 in 1914, \$167,000 less than in the previous year. The decrease is accounted for by a large decrease in the amount spent for repairs of locomotives and smaller amounts spent for repairs of passenger cars, and of smaller amounts charged for depreciation. For one thing, of course, the addition of the new locomotives, with the retirement of light locomotives, would have reduced the cost of repairs in any case; but apparently also considerable work was deferred, since at the end of the year 18.48 per cent of the total number of locomotives owned were undergoing or awaiting heavy repairs. It is quite possible that larger charges will be made next year for depreciation. The company was engaged at the end of the year on rewriting its equipment records, and a new policy will be adopted which will probably be considerably more liberal in regard to charges for depreciation and will be in accordance with the Interstate Commerce Commission's requirements that sufficient be charged each year to write off the total cost of equipment by the time it is ready for the scrap heap.

Transportation expenses amounted to \$12,258,000, or practically the same as in the previous year; but if it had not been for the economies effected by heavier trainloading, transportation expenses under conditions of operation existing in 1914 would have run up very much over the 1913 figures.

Taxes in 1914 amounted to \$1,500,000, an increase over the

previous year of \$212,000, or 16 per cent. This is a drain on the company's earnings which it is out of the power of the management to control, and it is a serious one.

The total tonnage of revenue freight carried by the Katy in 1914 was 9,122,000 tons. Of this total 39.13 per cent was furnished by products of mines, 22.24 per cent by products of agriculture, 15.19 per cent by manufacturers, 8.99 per cent by lumber and forest products, and 6 per cent by l. c. l. merchandise. The principal changes from the previous year were an increase in the tonnage of petroleum from 58,000 tons in 1913 to 199,000 tons in 1914, and an increase in the tonnage of forest products and lumber of 40,000 tons, the total in 1914 being 820,000 tons. This increase in lumber and forest products is very important, since this traffic is drag freight moving north, and if it can be developed will give the Missouri, Kansas & Texas what it so badly needs—a slow northbound tonnage.

At the end of 1914 the Missouri, Kansas & Texas had cash on hand of \$1,459,000, with loans and bills payable amounting to \$3,281,000. The company has \$19,000,000 notes maturing May 1, 1915. The financing, therefore, which will have to be done in the immediate future presents a problem of considerable proportions.

The \$19,000,000 notes are held, it is understood, in strong hands. In the five months since the close of the fiscal year the Missouri, Kansas & Texas has been making a remarkably fine showing. Net in these five months, after the payment of all fixed charges, was \$1,118,000. The transportation ratio in these five months was 34.60, as against 37.90 in 1913, a normal year; 41.32 in 1912 and 39.25 in 1911. With this good showing it would appear to be the best interests of everybody to tide things over until the notes can be permanently financed. The fact that the notes are held in strong hands should facilitate such a solution of the problem to a very marked extent.

The following table shows principal figures for 1914 and 1913:

	1914	1913
Average mileage operated.....	3,825	3,677
Freight revenue	\$20,228,337	\$20,912,978
Passenger revenue	9,105,242	9,402,967
Total operating revenues.....	31,521,188	32,346,258
Maint. of way and structures.....	4,574,726	4,637,748
Maint. of equipment.....	3,934,119	4,100,819
Traffic expenses	737,766	755,120
Transportation expenses	12,258,499	12,255,845
General expenses	1,217,009	1,058,880
Total operating expenses	22,722,119	22,808,412
Taxes	1,499,521	1,287,903
Operating income	7,299,548	8,249,942
Gross income	7,516,827	7,966,160
Net income	539,227	2,316,985
Dividends	261,429	521,052

NEW BOOKS

Proceedings of the International Railway General Foremen's Association.

Compiled and published by William Hall, secretary-treasurer of the association, Winona, Minn. 193 pages, 6 in. by 9 in. Bound in paper. The tenth annual convention of the International Railway General Foremen's Association was held at the Hotel Sherman, Chicago, Ill., on July 14, 15, 16 and 17, 1914. This book contains the complete report of the proceedings, including committee reports, papers and discussions. The association is to be congratulated upon the shortness of the time which has elapsed between the publication of the proceedings and the closing of the convention.

Proceedings of the American Society for Testing Materials. Part I, Committee Reports; Part II—Technical Papers. Size 6 in. by 9 in., 484 pages and 678 pages, respectively. Illustrated. Published by the society at the office of the secretary, University of Pennsylvania, Philadelphia, Pa. Price \$5.

For the first time the proceedings of the American Society for Testing Materials are published in two volumes, the constantly increasing size of this annual publication having made this advisable. Last year's volume contained 1,141 pages, and the combined volumes this year contain 1,162 pages. The division of the material has been made along natural lines, Part I containing the summary of the proceedings and all committee reports, and Part II, the technical papers. These proceedings cover the seventeenth annual meeting of the society and include many specifications, papers and discussions of interest to railway men.

Letters to the Editor

THE POSTOFFICE "SURPLUS"

CHICAGO, Ill.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I note in your issue of December 18, 1914, that the statement is made that there is an alleged surplus in the post-office department of \$3,600,000 for the last fiscal year. The only information available, to the humble voter, is such as an administrative head of a department may choose to give out. Calling a given item a surplus does not of course make it one and I have been curious, since this item has been given out for public consumption, as to the proper definition of the word surplus. Instead of surplus isn't this "net operating revenue?"

I have never seen a government report which gave a statement as to the amount of money invested in land, buildings and other similar facilities which must be utilized in the conduct of the business. The government must pay interest on money borrowed the same as anyone else and as long as we pay interest on a national debt, the item should appear as a charge against the so-called profits of operation. It is difficult to say how much money has been invested in postoffices, but I presume that such items are just as available for valuation as any other kind of property. Is there an item showing interest on capital invested?

There are a great many statesmen who will doubtless say that, as the property is used for the public benefit, this item should not be included. This sounds very well, but will not hold water. A public benefit is something in which all are or can be equally interested. When a public utility does not pay for itself the deficit is raised by taxation. This taxation has nothing whatever to do with the amount of service the utility gives to the person taxed. If the postoffice is not self-supporting, including the item of interest, then the many are being taxed for the benefit of the few. The extensive users of the mails, such as mail order houses, etc., are the largest beneficiaries, while the man with considerable property who gets 10 letters a week foots the bill.

PAUL M. LABACH,
Assistant Engineer, Rock Island Lines.

WHY DO NOT CHIEF DESPATCHERS RECEIVE MORE RECOGNITION?

KANSAS CITY, Mo.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

When a superintendent is required for a certain division a few employees on the line may be considered; but in many instances men from other railroads are brought in or possibly the position is given to some favored friend or relative. In either case a certain length of time is required for the new man to get his bearings. But who is the man most fitted for the place?

The chief dispatcher is more closely associated with the detailed operation of the line than any one on it. He is in constant touch with the superintendent in all problems concerning transportation propositions—the handling of men, and of power, maintenance of way, distribution of cars, prompt movement of cars and trains. He is held personally responsible for all delays and overtime, and for efficient work on the part of the men handling the every-day business out on the line.

When there is an obstruction to traffic he is the man who is looked to to arrange detours, to see to the care of injured persons and of damaged freight, and to arrange for the quick clearing of the track. When a proposition comes up which demands an immediate display of executive ability he is the one to act. Often, of course, he can converse personally with the super-

intendent, but many times this is impossible, and he is obliged to act alone.

A chief requisite in a superintendent is ability to build up and maintain a good organization. Another is to be able to figure out the every-day operating expenses and analyze the items. Who on the staff would be better qualified to do this than the chief dispatcher? His long association right by the side of the superintendent gives him a training and knowledge to fit him to handle the situation alone. In handling the men and dealing with the unreasonable demands of the labor organizations, who is better adapted to the task than the chief dispatcher? His long experience along that line has been greater than that of the average man on the line. His experiences as a telegraph operator, agent, clerk and trick dispatcher have given him an inside view of supervision which cannot be obtained from any other source.

After a man has mastered the telegraphic education and has reached the position of chief dispatcher; and has served in that capacity five or six years, and sees no chance of advancement, he naturally loses the ambition kindled in him years before; and concludes very likely to try some other avenue of employment. He may take a small agency on the road, a position as trick dispatcher, or may leave the railroad business entirely. But in that case has not the railroad lost many years of valuable experience which could be utilized to good effect? When a chief dispatcher is promoted it inspires the entire rank of telegraphers and clerical force with new energy. The failures made by promoted chief dispatchers are few and far between. All they want is a chance to demonstrate their ability. C. L. J.

THE INTEREST OF THE RAILWAYS IN A PROTECTIVE TARIFF ON STEEL

COLUMBUS, Ohio.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

To produce a ton of rails requires the digging of ore, the quarrying of stone, the burning of coke, the making of brick, etc., and the assembling of these materials at some convenient place, before the first operation of making steel rails can commence. The item of assembling—including largely the transportation charges—and the freight to place of consumption is more than one-third of the total cost. What is true of iron and steel is relatively true of every article included under the protective tariff.

In all discussion of the protective tariff, all the arguments have been in relation to the cost of producing steel after the materials have been assembled, and are ready for the furnaces; while sufficient prominence has not been given to this cost of assembling and the effect on the railroads and steamship lines. Not only must the transportation companies be protected in their rates, but they must be assured as to the volume of business, otherwise the cost of transporting every pound of freight in this country will be increased. For example, to make one ton of pig iron requires approximately:

Ore	1.85 tons
Coke	1.12 tons
Limestone .....	.50 tons
	3.47 tons

Freight charges for assembling this amount of material at Pittsburgh would be as follows:

Mesaba Range to Duluth.....	1.85 tons ore at \$0.60 per ton	\$1.11
Duluth to Lake Erie ports.....	1.85 tons ore at .55 per ton	1.02
Lake Erie to Pittsburgh.....	1.85 tons ore at .88 per ton	1.63
Connellsville to Pittsburgh.....	1.12 tons coke at .75 per ton	.84
One-half ton limestone, at approximately.....	.65 per ton	.32
		\$4.92

To make one ton of rails requires one and one-fifth tons of pig iron.

Freight charges for assembling sufficient material to make one ton of rails at Pittsburgh.....	\$7.77
Freight Pittsburgh to St. Louis, one ton rails.....	3.42
Freight Pittsburgh to New York, one ton rails.....	2.60

Using St. Louis as a central distributing point, the result would be as follows:

The transportation companies would receive on every ton of rails delivered at St. Louis from first to last.....	\$11.19
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If these rails were purchased abroad, they could be brought to St. Louis by way of New Orleans, and the railroads would receive about \$1.50 per ton as their proportion of the through rate, so that there would be an actual loss to the transportation companies, as a whole, of about \$9.15 per ton on every ton of steel rails purchased abroad and used in St. Louis and vicinity. Using New York as the point of distribution, the transportation companies would receive on every ton of rails made in this country and delivered at New York, \$10.37 per ton.

This does not take into consideration the freight on refractories and miscellaneous material used by the furnaces, nor the miscellaneous freight required by communities where iron ore and coal are mined and where coke and steel are manufactured, which supplies would not be transported or consumed here if our steel were made across the water. In either case this would show a great loss to the transportation companies in this country, all of which would accrue to the benefit of the foreign railroads and manufacturers.

These figures, vast in themselves when considering the production of steel rails in this country alone, are small when compared with the total production of pig iron from which steel rails are made, which amounted in 1907 to 25,781,361 tons, the direct transportation charges amounting to the vast sum of approximately \$200,000,000.

Can this country afford to have its material made abroad at such an enormous loss to American railroads, workingmen, farmers and manufacturers? It is impossible to employ men in any legitimate way without benefiting them and the community far more than their employers. Any individual, community or nation is wealthier each day only by the excess of what it produces over what it buys, and any individual in a nation that produces nothing, or less than what he consumes, is a burden on the nation to that extent.

A protective tariff must protect the nation as a unit; the division of the benefits among the individuals being an entirely different subject, to be treated absolutely apart and aside from any consideration of tariff schedules; but the benefits must practically all be eventually distributed, in the operation of the affairs of an enterprising community.

J. G. BATTELLE,
President, Columbus Iron & Steel Company.

ON TIME TWENTY WEEKS

SEATTLE, Wash.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I notice in your issue of December 11 an item to the effect that the Chicago, Burlington & Quincy, running 93 passenger trains from Denver to Chicago (1,034 miles) during the month of October brought in 92 of them exactly on time.

The "Oriental Limited" train of this company [the Great Northern], running between Chicago and Tacoma (a distance of approximately 2,400 miles), over two ranges of mountains, has arrived at Seattle and Tacoma—up to and including December 16—141 consecutive days on time. Schedule running time 72 hours, 11-car train.

J. H. O'NEIL,
General Superintendent.

RAILWAY CONSTRUCTION IN SWEDEN.—In view of the war, attention has been directed to the improvement of transport facilities between the United Kingdom and Russia via Sweden. It is stated that the board of the Swedish State Railways has decided upon the best route for the proposed railway from Stockholm to Kapellskär, and Immingham Docks are mentioned as a suitable connection on the English side, although apparently nothing is settled as yet. The routes for traffic across Sweden to Russia are of special importance now, as the Baltic is practically closed. New regular lines have been started between Stockholm and Gefle and Finland, while the Björneborg authorities are anxious to obtain a connection with Sundsvall. It is evident that Sweden, owing to its geographical position, will play an important part in the development of Russian trade with various countries.

St. Paul and Oregon-Washington Joint Terminals in Spokane

Extensive Grade Separation Work Required to Reach Passenger and Freight Stations in Heart of City

Although the transcontinental line of the Chicago, Milwaukee & St. Paul passes more than 25 miles south of Spokane, Wash., all of that company's through passenger trains are now run through Spokane over tracks used jointly with the Oregon-Washington Railroad & Navigation Company. This project, which enables the St. Paul to reach Spokane, involved the construction of about 20 miles of new line from Plummer Junction, on the main line 41 miles southeast of Spokane, to Bell Junction on the O.-W. R. & N., 21 miles from Spokane, as well as the work of building a new line through the heart of the city to reach the new joint passenger station. The through trains now run over the new line from Plummer Junction to Bell Junction, the old O.-W. R. & N. line to the Northern Pacific crossing in Spokane, the new St. Paul line to the union station, and the new O.-W. R. & N. Spokane-Ayer line as far as Marengo Junction, 61 miles. This route is about 14 miles longer than the main line and in places contains considerably higher grades than the older line, so that it is not expected that any freight traffic

Beginning at the Northern Pacific crossing the new St. Paul line extends east on a level grade as far as Erie street, all intermediate streets being carried under the railroad. A timber bridge about 750 ft. long carries the new line over Ivory street, Erie street, and the tracks of the Spokane & Inland Empire. West of Erie street the grade is 1.2 per cent, descending as far as the Trent avenue subway, the line skirting a bend in the Spokane river on a 200,000 cu. yd. rock fill made in 47 ft. of water. At the west end of this fill the line enters a solid rock cut with a maximum depth of 27 ft. A double track subway 850 ft. long was built in this cut to carry the Northern Pacific and Great Northern transfer tracks and Trent avenue.

From the west end of the Trent avenue subway the passenger tracks continue on a slight descending grade under Market street, which carries a double track line of the Spokane & Inland Empire and then under Division street, carrying a double track street railway line. From Division street the main line rises on a maximum grade of 1.24 per cent to the station, crossing Center



Typical Reinforced Concrete Street Subway Near the East End of the Work

except local business will move over the new loop. As the new O.-W. R. & N. line from Spokane to Ayer was described in the *Railway Age Gazette* of May 31, 1912, and the new joint passenger station in the issue of October 31, 1913, the present article will refer principally to the St. Paul construction work between the junction with the old O.-W. R. & N. line on the east side of the city and the new station.

The new joint line through the city was financed in three sections; one from the Northern Pacific crossing to Center street, built and paid for by the St. Paul; one from Center street to Monroe street, including the station building, paid for by both companies on an equal basis, and one extending from Monroe street to the western city limits, built and paid for by the O.-W. R. & N. The cost of the terminals and approaches in Spokane is about \$7,500,000. The new station, built at a cost of about \$600,000, and opened on September 15, is shown in one of the accompanying illustrations. The principal feature on the O.-W. R. & N. section is the high steel bridge spanning the falls in the Spokane river and crossing over the Monroe street concrete arch bridge.

street on an overhead structure. The tracks branch out from a point just west of Center street to eight station tracks. These station tracks are supported on a steel and reinforced concrete structure.

At the west end of the Trent avenue subway the yard tracks leave the main line, one team track being built to the north of the main line on an ascending grade to the west, crossing the Spokane & Inland Empire at grade in Market street and extending on the street level to Division street. The switch lead leaves the main line on the south and extends west to Division street on the grade of the main line, dropping from Division street to Center street, which is crossed at grade. At Division street four team tracks lead off from the switch lead extending to Center street. A warehouse track also leaves the switch lead near the west end of the subway and extends on the grade of the switch lead to Division street. West of Division street the switch lead descends, crossing Center street at grade and branching out to form two additional team tracks and three house tracks serving the freight house, which is located between Center and Washington streets. The house tracks and the two team tracks, as well

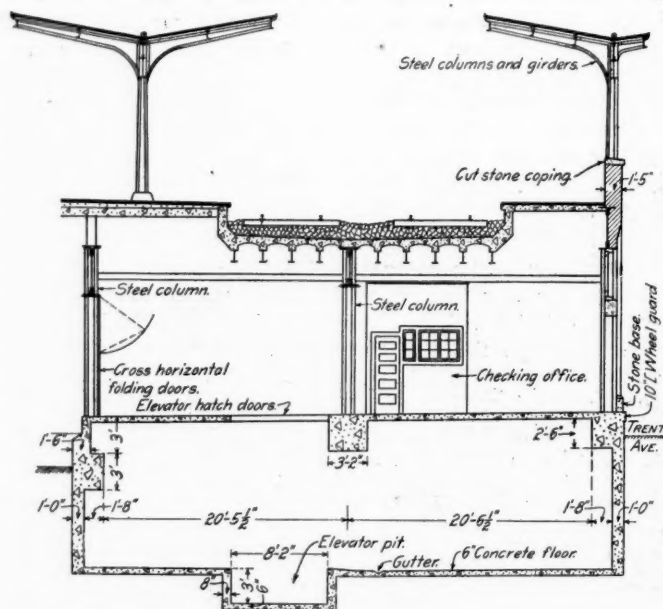
as a portion of the freight house, extend under the structure supporting the high level passenger tracks.

On the section east of the river fill, five reinforced concrete subways of the girder and slab deck type supported on four-post arch bents at the curb line and center line of street, were built to carry streets under the tracks. The reinforced counterfort abutments on these subways were poured continuously with double shifts to improve their appearance and to do away with the horizontal construction joints. One of these typical bridges is shown in an accompanying illustration. There are also four permanent alley crossings of reinforced concrete of the slab type on this section of the work. The slabs are supported by vertical barrel walls struttled at the base with cantilever type wing walls. Five timber bridges were also built east of the river, where the conditions at the present time are unfavorable to final construction.

The river fill was made from material excavated west of the Trent avenue subway which was hauled with 18-ton dinky engines and 4-yd. cars. The cars were dumped from two-post pile trestles constructed in the river. As this fill was built across the main channel of the river, there was a question as to the effect of the change of the current on the opposite bank. This led to the adoption of a plan to build the fill up to the elevation of low water and then build a timber trestle on this fill for the permanent work. When the low water level fill was completed and the river had reached its high stage, it was found that the current had been materially improved and instead of cutting diagonally across the river was now following the line of the fill parallel with the bank to the north.

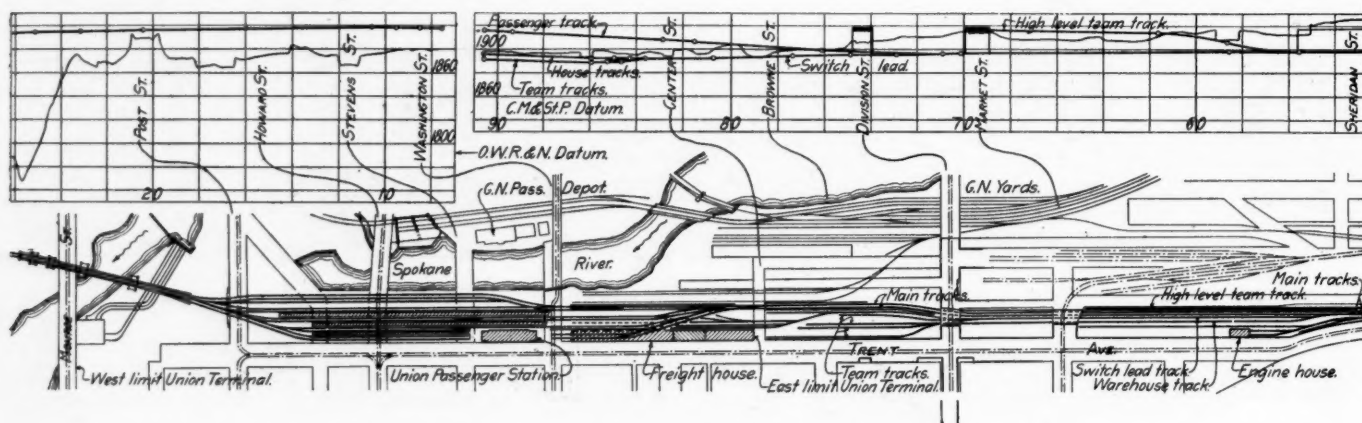
The bridge carrying the Great Northern-Northern Pacific transfer track which is contiguous with the Trent avenue subway, consists of side and center reinforced concrete walls supporting an I-beam deck encased in concrete. The subway, which is of the slab type construction has a span varying from 29 ft. to 45 ft. The walls are 12 to 22 in. in thickness. The excavation for the subway amounted to 46,000 cu. yd. of solid rock, the depth averaging about 22 ft. On account of the proximity of this work to the building of the Schade Brewing Company, a great

side of the city. This was accomplished by driving a cut 16 ft. wide, which was spanned with 32-ft. stringers covered by a plank deck. After this narrow preliminary cut was finished, a timber bent was erected under the center of the stringers, which were then pulled out on each side of the bent with their ends butting. It was then possible to widen the cut without delay to the street



Cross Section of West End of Milwaukee Freight House Showing Passenger Tracks and Platforms Supported on Roof

cars or team traffic. The concrete for the subway was poured from a single plant located in the center of the work, consisting of a 3/4-yd. Smith mixer which was fed from a 30-yd. hopper. The material was loaded by a clam shell bucket from cars and the concrete was handled from the mixer in hopper cars dump-



Plan of Milwaukee's Entrance to Spokane and Union Passenger Station Property

deal of care was required and considerable expense involved in avoiding damage to the building. A powder inspector was kept constantly in sight, who noted on a plat furnished him each day, the location, size and depth of each hole, the charge and the type of shot, and the mat and timber protection.

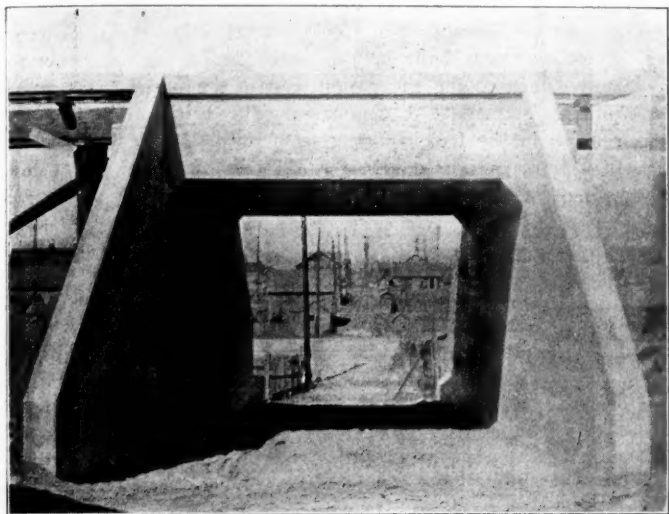
A 24-in. sewer extending down the center of the cut was relocated on the south side of the excavation as far as the Northern Pacific-Great Northern transfer bridge, at which point it was dropped into a manhole and carried under the subway to the river on the east. At the intersection of Trent avenue and Sheridan street, it was necessary to keep the street open for its entire width on account of the Washington Water Power Traction Company's line and the exceptionally heavy street traffic using this main artery of travel from the business section to the east

ing directly into the forms. As this work was done during the winter all of the material was heated, the forms were covered with canvas and the temperature was raised by steam.

A considerable length of retaining wall was built along property lines and between high and low level tracks in the territory west of the Trent-avenue subway. The wall separating the main line and the northerly team track, the one along the Trent avenue property line from the subway to Center street, and the walls on both sides of the main line tracks between Division street and Center street, are of Cycloped concrete, utilizing the stone removed from the cut. The wall along the team track is of a special section with a narrow base increasing in width up to approximately the mean height of the wall, from which it assumes the ordinary section. This design was adopted in order to re-

duce the amount of concrete and also the amount of rock excavation as the wall is founded directly on the solid rock. The other Cyclopien walls are of standard gravity section.

The Market street bridge is of the through girder type, the deck being encased with concrete. The rails of the Spokane & Inland Empire tracks are attached directly to the structure with cast iron dogs. The street over the bridge is paved with wood blocks. The west abutment is of Cyclopien concrete, poured flush against the rock at the back to the level of the bridge

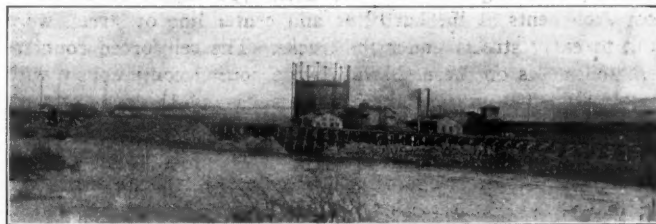


One of the Standard Reinforced Concrete Alley Subways

seat. The east abutment consists of a face wall not more than 18 in. thick with a footing at the top of the abutment 2 ft. deep. This footing was anchored to the rock with 1-in. split rods set in poles in the rock. This type of construction was made possible by the fact that the rock at this point breaks in practically a vertical plane.

In order to avoid a grade crossing at Division street it was necessary to raise the street grade 11 ft. at its intersection with

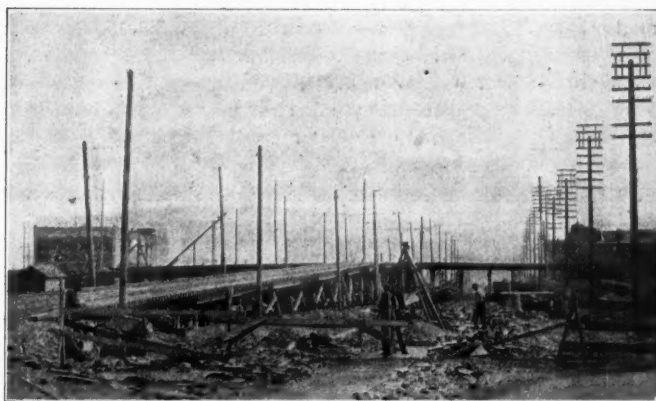
higher than the finished street grade. A temporary street was also built across railway property from Browne street northeast to the Great Northern bridge. This temporary street, consist-



Making the Fill Across the Bend of the Spokane River

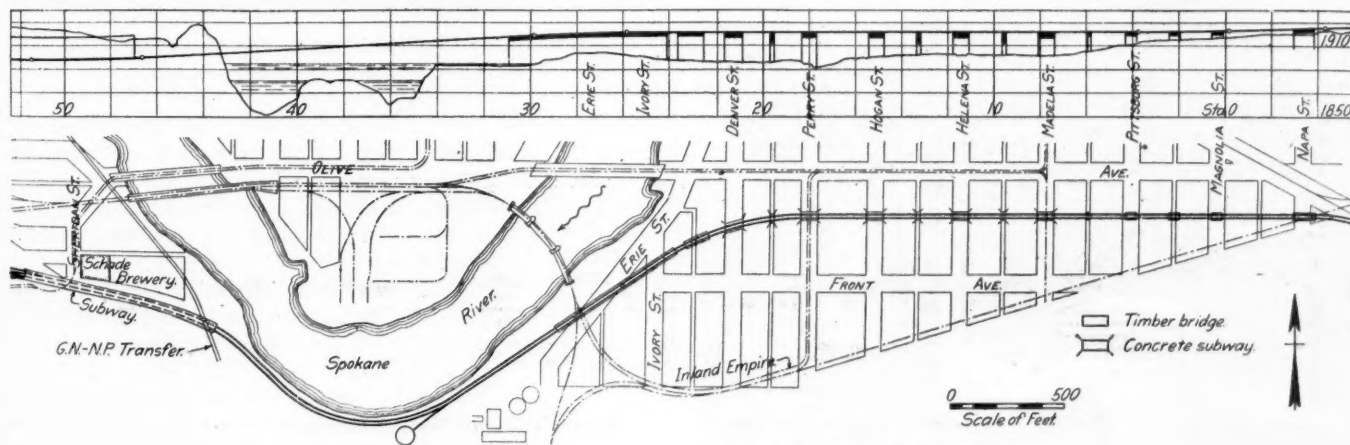
ing of a 40-ft. roadbed, was also carried on a timber trestle.

The regrading necessitated the raising of four water mains; one 12-in., one 16-in., one 24-in. and one 30-in. pipe. The 12



A Portion of the Temporary Trestles Carrying Street Cars and Team Traffic During the Regrading of Trent Avenue

and 16-in. mains were of cast iron and were raised by being jacked up as a unit and supported on small timber bents during



Plan of Milwaukee's Entrance to Spokane and Union Passenger Station Property

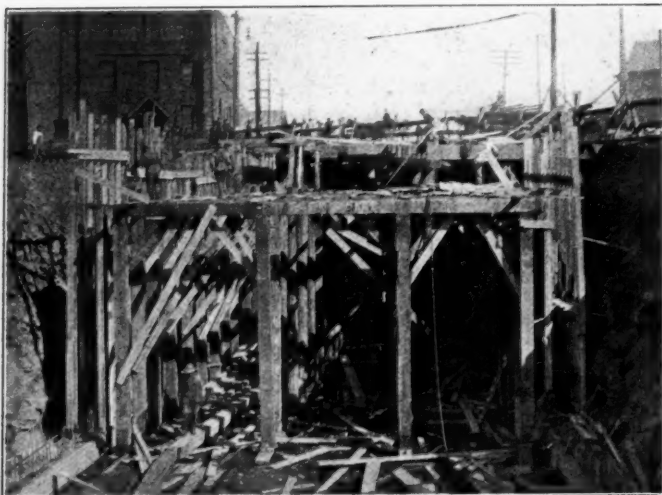
Trent avenue. As Division street is the main artery of travel from the business section of the city to the large and populous north and northeast sections, and as there was absolutely no other route by which travel could be diverted, it was necessary to handle this traffic throughout the construction work satisfactorily to the public and the Public Utility Corporations. This was done by building a double track standard timber trestle on railway property parallel to Trent avenue from Market street to Browne street, and on Division street from the south property line to the Great Northern bridge. These trestles were for the exclusive use of the street railways and to facilitate construction of the permanent work they were built approximately 10 ft.

the process of filling. The 24-in. and 30-in. mains were high pressure pipes supplying the south side of the city and business center. They required a great deal of special work. New pipe was placed in a permanent location over the right of way, the connections between the old and the new mains were made in five hours, and the old main was then salvaged.

Reinforced concrete walls of the cantilever type were built along all property lines in the regrade district. The fill was made of rock from the right of way excavation, a dirt and gravel pad being placed on top to receive the pavement. The buildings were raised to meet the new grade by the property owners, the railroad being assessed damages. The Division

street bridge is similar to that at Market street, with the exception that the abutments are of the reinforced counterfort type.

The St. Paul's new freight house is located along Trent avenue, between Center street and Washington street. It is 778 ft. long and 46 ft. wide with a full basement excavated in solid rock. A two-story office building 126½ ft. long separates the inbound and outbound sections of the house. The foundations



Trent Avenue Subway, Showing Wall Forms

and the street level floor are of reinforced concrete, the floor being of the girder and slab type construction. Above the street floor the walls are of a dark building paving brick. The house is of the continuous door type, horizontal cross folding doors being installed. Access is had to the basement for freight serv-



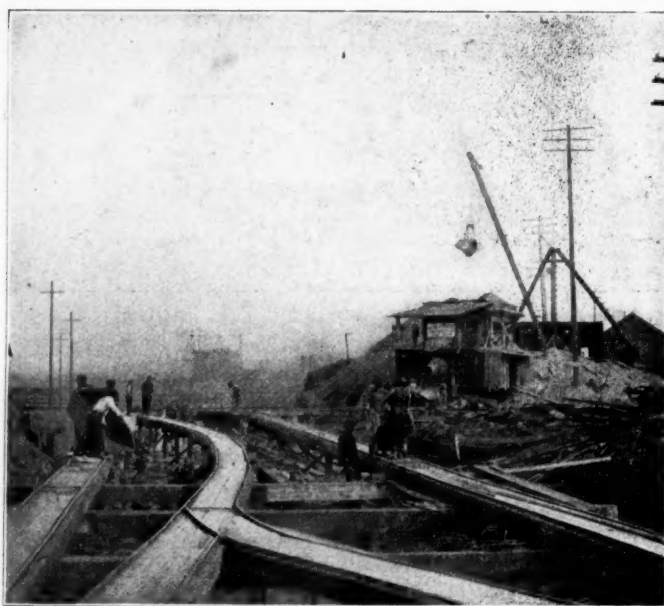
Front View of Recently Opened Union Passenger Terminal in Spokane

ice by four hydraulic elevators. The roof is of reinforced concrete carried on steel columns and girders. West of the office building the roof of the freight house carries two of the passenger tracks and one platform adjacent to the passenger station. The troughs in which these tracks are laid are waterproofed and protected by sand mastic. The platforms are finished with 1½ in. of asphalt mastic and are covered by butterfly sheds.

The following quantities show the amounts of materials used in construction:

Timber	2,114,885	ft. B.M.
Piling	32,053	lineal ft.
Bridge iron	81,949	lb.
Reinforced concrete	24,328	cu. yd.
Cyclopien concrete	21,803	cu. yd.
Plain concrete	2,219	cu. yd.
Rubble masonry	422	cu. yd.
Reinforcement	2,179,361	lb.
Paving asphalt	3,113	sq. yd.
Paving brick	4,476	sq. yd.
Paving vitrified block.....	12,635	sq. yd.
Excavation	230,400	cu. yd.
Structural steel	3,571	tons

The concrete work east of Center street, including the Trent avenue subway was built by the Bates & Rogers Construction Company, Chicago; the excavation west of the subway was made by Guthrie, McDougal & Company. The brick work and interior finish in the freight house was contracted to the Hurley, Mason Company. The concrete work west of Center street and all paving was handled by company forces, and all structural



Concrete Mixing Plant and Distributing Tracks for Placing Concrete in Trent Avenue Subway

steel was erected by company forces under Ed. Howell, general foreman, of steel bridge crews. The work was in charge of A. G. Holt, division engineer, until February, 1913. Upon his promotion to assistant chief engineer, with headquarters at Chicago, George M. Rice, division engineer, took charge, reporting to E. O. Reeder, assistant chief engineer at Seattle, and to C. F. Loweth, chief engineer, who handled all designs direct. Lyman M. Chase, who had charge of the field construction throughout the work, furnished a large part of the foregoing information.

SWEDISH-RUSSIAN RAILWAY BUILT.—Press despatches report that on January 6 the railroad circling the Gulf of Bothnia, the northern extension of the Baltic Sea was virtually completed. Up to the present time there has been a gap of 10 miles over which passengers from Stockholm to Petrograd had to drive. Now this distance has been reduced to half a mile. The Russian line now runs to a point opposite the Swedish station at Karungi. Here passengers leave the train and go half a mile over the frozen river Tornea. This is instead of the previous journey between the towns of Tornea and Haparanda, a distance of 10 miles. The new arrangement is said to be working well. Between 500 and 800 passengers make the trip daily, the uncertainties of steamship travel between the Swedish coast and Russian ports near Petrograd having, of course, influenced many travelers to select the land route. Heavy freight also is being moved over land with little delay.

Railroad Rates from Investors' Point of View*

Relation That Should Obtain Between Gross Earnings and Various Kinds of Outgo for Satisfactory Credit

By JOHN E. OLDHAM

Of Merrill, Oldham & Company, Investment Bankers

In the recent proceedings before the Interstate Commerce Commission in connection with the petition for an increase in railroad rates in Official Classification territory, there were submitted certain figures and statements bearing upon the earnings and capitalization of a group of standard railroads.

The purpose of these statements was:

First, to show the financial conditions which surrounded railroad securities of the highest grade during the period 1900 to 1909, when confidence in railroad investments of the better class was very general and capital was readily obtainable by roads of high credit.

Second, to determine whether the high credit which these roads had enjoyed was founded upon any well-defined economic principles or conditions which must be recognized in making fair and reasonable rates.

Third, to ascertain as far as possible, by a comparison of the financial statements of these railroads for the 10-year period above referred to with similar statements for 1913, whether these conditions had changed sufficiently to justify a weakening of confidence in the securities of these roads, and to account for the difficulty of obtaining new capital to meet their requirements.

To this end, examination was made of the financial affairs of several important railroads which were considered as having high credit. These included practically all the roads whose bonds had been admitted to savings bank investment under the general provisions of the laws of New York and Massachusetts, a few exceptions being made of companies which showed features not regarded as normal. It was believed that the companies finally chosen, if their operation were merged into an average, would form a concrete illustration of the kind of property in which investors formerly had confidence.

The following are the 19 roads from which the average property was made up: Atchison, Topeka & Santa Fe; Baltimore & Ohio; Buffalo, Rochester & Pittsburgh; Chicago, Burlington & Quincy; Chicago, Milwaukee & St. Paul; Chicago & Northwestern; Chicago, St. Paul, Minneapolis & Omaha; Delaware & Hudson; Delaware, Lackawanna & Western; Illinois Central; Lake Shore & Michigan Southern; Louisville & Nashville; Maine Central; Michigan Central; Nashville, Chattanooga & St. Louis; New York Central & Hudson River; Norfolk & Western; Northern Pacific; Pennsylvania.

An analysis of the average financial statement made by these roads for the period 1900 to 1909 shows that there was then outstanding an amount of capitalization—representing funded debt, rentals capitalized at 5 per cent, and capital stock—equal to \$5.40 for every dollar of gross earnings. Or, in other words, for every \$100,000 of gross earnings there was \$540,000 of capitalization.

The statement also shows that every dollar of gross earnings received was so employed as to be divided into two parts, one representing the cost of service, including maintenance and taxes, incurred in earning the dollar, and the other the amount available for the capital employed in earning the dollar. For every \$100,000 earned, this division was as follows:

Cost of service	\$67,400
Available for capital.....	32,600
	<hr/> \$100,000

To the amount of \$32,600 available for capital, there was added \$4,200 income from outside operations and investments, which made a total of \$36,800. Of this amount available for

distribution, a part was used to pay fixed charges in the form of interest and rentals; another part was paid to stockholders in the form of dividends; and a third part was retained by the company in the form of surplus. This disposition of the \$36,800 was as follows:

Fixed charges	\$16,300
Dividends	10,900
Surplus	9,600
	<hr/> \$36,800

As there was \$36,800 available for return on capital and as the capitalization was \$540,000, the maximum which could have been paid would have been the entire \$36,800, and this would have amounted to about 6.8 per cent on the amount of capitalization. It will be seen, however, that only \$27,200 was actually paid, and that this amount was equal to about 5 per cent on the capitalization.

It may be inferred from these figures that the investors of the \$540,000 were satisfied with the payment of 5 per cent on their investment at that time, and that, for actual purpose of distribution, the railroads needed to have available only \$27,200. The existence of the surplus, however, instead of being a matter of indifference, as might be inferred, was actually a matter of the greatest consequence.

NECESSITY FOR THE MAINTENANCE OF A SURPLUS

The railroads in the years 1900 to 1909 were growing rapidly, and in order to meet the requirements of this growth were constantly demanding new capital. The amount required could be raised permanently only by the issue of bonds or stocks to permanent investors. In order to attract these investors it was necessary for the railroads to show that investment in their bonds and stocks meant safety of income. The only way in which this safety of income could be demonstrated was by proving the existence of a margin of safety which the investor would consider sufficient to meet contingencies.

A company which made a financial showing equal to the average of the 19 companies could offer bonds to investors with the statement that all fixed charges were earned about two and one-quarter times over. It could offer stock to the public with the statement that its dividends were earned nearly twice over. Under these circumstances investors showed themselves satisfied with the terms offered, as is evidenced by the fact that high-grade bonds of these railroads sold at times during this period at prices which yielded less than 3½ per cent, and that, except for short periods of financial disturbance, standard issues seldom sold below a 4 per cent basis. Similarly, in the years 1900 to 1909, many of the best railroad stocks sold at times as high as a 4 per cent basis and, except in the periods of disturbance mentioned above, seldom sold below a 4½ per cent basis.

If the average company had paid, as has been shown, \$16,300 for interest and \$10,900 for dividends, but had had no surplus, it would have had to sell bonds on the strength of a statement showing the fixed charges earned only about 1.67 times over, instead of two and one-quarter times. This would have meant more expensive financing.

If the stock could not be sold at par or thereabout, and if it be assumed that, with good properties, capitalization should represent actual value, and that stock issued at a discount means over-capitalization, then bonds would have to be depended upon entirely, and as the amount of bonds grew while the stock remained stationary, the fixed charges would require an increasing

*Abstract of paper presented at the Third Annual Convention of the Investment Bankers' Association, at Philadelphia, November 13, 1914.

share of the amount distributed to security holders, the margin over fixed charges would gradually decrease, and the company of good credit would inevitably become a company of poor credit.

MAINTENANCE OF CREDIT

If it was desirable that these railroads should have the credit which they enjoyed in this period, it would seem also desirable that this credit should be maintained. And this leads to some consideration of what is meant by the maintenance of credit. In commenting on this point in its rate decision in 1911, the Interstate Commerce Commission used the following language:

The general rate of interest has advanced and the price of a bond bearing a given rate has, therefore, declined. This by no means indicates an impairment of railway credit. There is no reason to suppose that railroad bonds bearing a proper rate of interest might not readily be disposed of today.

It appears to be a sound contention that a higher interest rate does not necessarily imply a loss of credit, and it would seem to be beyond question that a 5 per cent bond should be as desirable as a 4 per cent bond from the standpoint of security if it is equally well protected. This latter point, however, is of the greatest importance.

In order to maintain an equal credit over a period of years a company must maintain substantially the same ratio between net earnings and fixed charges. It is plain, therefore, that if the fixed charges increase, the protection in the form of surplus must increase proportionately if the same degree of protection is to be maintained. Generally speaking, the same consideration holds true as to dividends and their protection.

Consequently, it will be seen that the requirements of a company in the way of fixed charges and dividends cannot be considered independently of the surplus which is required to protect them. It has been shown in the figures for 1900 to 1909 that the capitalization of the average property received 5 per cent and that investors were satisfied with it. But it has also been shown that an additional 1.8 per cent was earned on this capitalization, and it may be assumed that the 1.8 per cent was necessary to keep the holders of the capitalization satisfied with the 5 per cent.

If it is true that the surplus is necessary in order to give investors assurance of protection to their income, and that a lack of surplus leads to a cessation of investment, it must be granted that a surplus is as much a part of the cost of capital as the part which is actually paid to the investors in charges and dividends. As charges and dividends must come from the current yearly earnings of a property, the surplus must also come from this source as surely as must the payments for the current operation of the property.

There has been in the past some lack of agreement as to the functions of a surplus, which has come from confusion between the ultimate disposition of a surplus and its reason for existence. As recently as the rate case decided in 1911, it was contended on the one hand that surplus earnings were needed to provide funds for improvements, and on the other hand that the users of the railroads ought not to be called upon to pay higher rates in order to provide the railroads with money which should properly be raised from new capital.*

The apparent lack of agreement, however, arises from the fact that the disposition of the surplus is merely an incident arising from its existence. The fundamental fact is that the railroads must prove to the investors that they are earning every year a sufficient surplus to serve as protection to the investors' income. When this surplus has once been earned it may be used to improve the property, or to reduce by means of sinking funds the obligations of the corporation, or to purchase additional property.

It may be assumed, then, that the investors will assess upon the railroads, as the cost of the capital which they supply, a fair return upon this capital in the form of annual payment, and

a further amount by way of protection which, when earned, is left at the railroads' disposal. There is no assurance, however, that these requirements will remain the same over a period of years, because there is no assurance that the rates for money will remain stationary.

The tendency of rates of investment to fluctuate makes it inevitable that a return which was satisfactory to investors in the period from 1900 to 1909 may not be equally satisfactory in a different period. Where 5 per cent on the capitalization was at one time satisfactory, investors may at another time require 5½ per cent or 6 per cent, and may require this 5½ per cent or 6 per cent to be as well protected against contingencies as the 5 per cent had been.

Applying such a supposition to the case of the railroads, a demand by investors for 6 per cent instead of 5 per cent in the way of actual payment and a surplus proportionate to that which protected the 5 per cent payment would considerably increase the requirements of the railroads; and if added to the cost of service the total might amount to more than the available gross revenue. For instance, on the basis of \$540,000 capitalization, and with the same allowance for other income as actually received in 1900-1909, a 6 per cent payment would result in bringing the cost of capital and service incurred in earning \$100,000 up to \$106,900, as follows:

Cost of capital.....	\$39,500
Cost of service	67,400
	<hr/>
	\$106,900

The cost of service is, of course, liable to fluctuation from the effect of changes in wages, prices and other operating conditions. If either cost of service or cost of capital, or both factors, increase, while the revenue remains stationary, a case may be presented similar to that suggested, where \$106,900 is required and only \$100,000 is earned; and the railroads are put in the uncomfortable position of being unable to meet their requirements out of their earnings. Consequently, if relief from this impossible situation is to be had, it must come in one or another of two ways.

1. The cost of service, or the cost of capital, or both, must again be decreased to a point within the \$100,000, or—

2. The \$100,000 must be increased to a point which will cover the increased costs of service and capital as, for example, to \$106,900 in the case shown above, after which each factor will resume its place as a proportionate part of the gross earnings and the parts will once more be in adjustment.

It appears, however, that under the conditions which actually existed in the period from 1900 to 1909, the \$100,000 was sufficient to meet the demands upon it, and that the cost of service and cost of capital were adjusted in a manner which was satisfactory for that period, the test of successful adjustment being that capital flowed freely from the investors to the railroads, and the investors were apparently satisfied with the conditions surrounding their investments.

THE SHOWING FOR 1913

After the foregoing consideration of the figures for the years 1900-1909, and the conclusions which may be drawn from these figures, namely, that the various factors which determined the financial showing of the 19 companies appeared to be correctly proportioned according to the conditions then existing, reference may be made to similar figures for the year 1913, showing the operations of the same 19 companies in that year.

These figures show that for every \$100,000 of gross earnings there was outstanding in 1913 \$505,000 capitalization as against \$540,000 in the period 1900-1909. Each \$100,000 was divided as follows:

Cost of service	\$74,300
Available for capital	25,700
	<hr/>
	\$100,000

To the \$25,700 there was added \$6,600 income from other in-

*Decision, February 22, 1911, p. 265.

vestments, making \$32,300 in all, and this was disposed as follows:

Fixed charges	\$14,200
Dividends	12,000
Surplus	6,100
	<u>\$32,300</u>

The bearing of these figures will perhaps be better appreciated if placed in comparison with the figures for the period 1900-1909.

	10-Year Period	1913
Gross	\$100,000	\$100,000
Cost of service	67,400	74,300
Available for capital	32,600	25,700
Other income	4,200	6,600
Total available for capital	36,800	32,300
Fixed charges	16,300	14,200
Dividends	10,900	12,000
Surplus	9,600	6,100

The cost of service incurred in earning \$100,000 in 1913 had considerably increased over that for the 10-year period. This increase was the final result of the increased cost of wages and materials and other operating factors in the face of the efforts of the railroads to obtain more economical operation.

It is assumed that the 19 railroads, being among the best in the country, commanded the services of managers who used their best efforts toward counteracting rising costs by increased efficiency. In fact the records of these companies show a greatly increased efficiency of operation; and in the absence of evidence that these railroads were burdened with lax and inefficient management, it may be assumed that the rise in cost of service from \$67,400 to \$74,300 was inevitable, and took place in spite of every reasonable effort on the part of the railroads to offset it.

This increase in the cost of service left a smaller amount available for capital, so that even with a slightly larger revenue from outside investments, the total amount available was \$32,300 as compared with \$36,800 for 1900-1909.

It has been shown above that there was in 1913 \$32,300 available for capital as against \$36,800 for the 10-year period. There were indications, however, that the requirements for capital in 1913 might be somewhat reduced from those of the 10-year period. In the first place the total capitalization was only \$505,000 as against \$540,000 for the earlier years. Of this capitalization, fixed obligations were only \$320,000 as against \$340,000 in 1900-1909, and the ratio of charges paid on these obligations was even less, the amount paid being only \$14,200 in 1913 as against \$16,300 in the earlier period. This would seem to indicate that the cost of capital would be less burdensome as there was a smaller amount on which to pay a return, and that the credit of the railroads should also be improved by the fact that fixed charges were somewhat reduced. A further apparent indication of the good treatment of capital came in the fact that while the amount of stock decreased from \$200,000 to \$185,000, the amount paid out in dividends increased from \$10,900 to \$12,000.

No conclusion can be drawn from these facts otherwise than that they have greatly assisted the railroads to exist on the revenue which they have been receiving at a time when costs for service were constantly increasing. No other conclusion is sought to be drawn from them. In order, however, to place them in their proper light as bearing on the present inquiry, it must be understood under what circumstances these facts came about.

The entire capitalization over the period was shown to have decreased somewhat, and this might be assumed to indicate a lower initial cost of financing the railroad business. It is necessary to remember, however, that the existence of substantial amounts of surplus has led to expenditures for improvements without increase of new capital issues, *first*, by the expenditure of the surplus itself, and *second*, by funds derived from premiums on stock made possible by high credit due to the existence of the surplus.

To the extent to which this can be carried out, the railroads are able to improve their position somewhat, as has in fact

been done; but as normal growth of traffic leads to constant capital expenditures it should be plain that in years when substantial amounts of surplus are not available, recourse must be had to new capital for the entire expenditures required. The expense of financing the railroad business in order to gain \$100,000 gross earnings is not stationary, any more than the cost of operation, and in view of the higher prices in recent years of labor and materials, and the increasing demands for improved service, the conclusion should not be hastily drawn that, because the face value of the capitalization was less, it required less actual investment to obtain \$100,000 revenue in 1913 than in earlier years. The conclusion should perhaps rather be drawn that the necessary surplus earnings demanded by the investors have enabled the railroads to meet the requirements of their growth without incurring the fixed charges which would have been required by the issue of the entire amount in the form of new capital if the surplus had not existed. Expenditures for additions and improvements from surplus or premiums on stock are invested capital, as well as the amounts represented by the face value of capital obligations.

With regard to the lower rate paid in fixed charges, this would appear to be contrary to the tendency of the period under consideration as officially recognized by the Interstate Commerce Commission in the quotation already cited, and as evidenced by known facts. Some study of the obligations of these railroads will show, however, as a factor bearing upon this situation, that at the beginning of the period 1900-1909, the railroads were paying the cost of capital raised many years before, when money rates were high and railroad credit lower. Between 1900 and 1913 over \$300,000,000 bonds bearings rates of 5, 6, 7 and even 8 per cent were refunded by these companies, and the replacing of these in a large measure by bonds bearing a much lower rate at a time when circumstances were more favorable than in the past or than now existing, provided a further means by which the railroads were enabled to offset higher costs of operation.

With regard to the higher dividends, the fact that the rate for 1913 was higher than that for the period 1900-1909 might seem at first glance to show that the stockholders had had their dividends raised in the face of rising costs of operation, and in a period when the railroads were actually asking relief in the way of higher rates for service. Consideration of the rates of dividend paid, however, shows that there has been very little change in the last few years and that the difference between 1913 and the 10-year period lies in the fact that during the earlier part of the 10-year period some of the 19 roads, in order to improve their credit and financial standing, were paying very low dividends, or none at all.

When these facts are properly understood and given their true value, they may be taken to show, as has been suggested above, that they permitted the railroads to have an easier task in meeting the higher cost of service than would have been the case if the conditions of the earlier period affecting capital had still been operative. The effect of these conditions was reflected to some extent in the figures for 1913, which showed that on \$505,000 of capitalization there was an amount available for interest and dividends of \$32,300, or 6.4 per cent. This compares with 6.8 per cent in the earlier period. Of this \$32,300, \$26,200 was actually paid out in interest and dividends, amounting to 5.2 per cent as against 5 per cent in 1900-1909. And this left a surplus of \$6,100, or 1.2 per cent on the \$505,000 as against 1.8 per cent surplus in 1900-1909. This may be more easily followed in the form of a table:

	1900-09	1913
Earned on capitalization.....	6.8 per cent	6.4 per cent
Paid on capitalization.....	5.0 per cent	5.2 per cent
Surplus on capitalization.....	1.8 per cent	1.2 per cent

It would not appear, in view of this statement, that the security holders of these railroads taken as a whole were worse off in 1913 than in the earlier period by way of return actually received on their investment. They were, in fact, receiving a

little more on the face value of their securities than the average received in the period 1900-1909. Owing to the reduction of fixed charges the railroads could still offer bonds with the statement that fixed charges were earned about two and one-quarter times over, and while the amount of margin over dividends was not so large as it formerly was, there was still a substantial margin.

It has been shown, however, in the period 1900-1909, that the test of the successful adjustment of revenue between cost of service and cost of capital was the fact that securities flowed freely from the railroads to the ultimate investors. If this test is applied to the conditions of 1913 it will be found that this feature was lacking. Instead of long-term bonds and stocks being taken readily by investors, it appears that the investors showed little enthusiasm for railroad securities. When bond issues were discussed the investors would only offer prices yielding a rate at which the managers of the roads thought it imprudent to finance permanently; and at the same time railroad stocks which had formerly sold well above par, now sold so near par, although receiving the same rate of dividend, that new offerings of stock at par no longer bore the character of bargains and were rejected as impracticable.

Accordingly, the flow of securities from the railroads to the investors was checked. And this showed itself by the appearance of a quantity of short-term notes representing temporary financing.

The failure of this test which was applied successfully to the earlier period indicated that some part of the delicate financial adjustment of the railroads was out of order; and a summary of the facts seemed to indicate that while these railroads were paying as large a return to capital in 1913 as in the earlier period, there was some question as to whether they should not be paying a still larger return in order to attract the necessary new funds.

To illustrate: In July, 1901, a Chicago, Milwaukee & St. Paul general mortgage 4 per cent bond due 1989, which is a fair sample of a high-grade railroad bond, sold at about 110, at which price it yielded about 3.62 per cent. In July, 1905, it sold at 111, yielding about 3.58 per cent. In July, 1909, it sold at 104, yielding 3.84 per cent. Whereas in July, 1913, it sold at 91, yielding 4.41 per cent.

Similarly, Pennsylvania Railroad stock, a standard investment, paying 6 per cent in each of the years named, sold in 1901 at 152, yielding about 3.95 per cent; in 1905 at 140, yielding about 4.30 per cent; in 1909 at 136, yielding about 4.40 per cent; and in 1913 at 111, yielding about 5.40 per cent.*

It is not necessary to multiply instances. The facts are plain that the yield which investors required from their investments was considerably in excess in 1913 of what it was in the period 1900-1909. Neither is it necessary to discuss whether this was more particularly true of railroad securities than of other forms of investment. Its application to the present inquiry comes in the fact that while the rate required by investors had advanced $\frac{1}{2}$ per cent to $\frac{3}{4}$ per cent on bonds and 1 per cent to $1\frac{1}{2}$ per cent on stocks, the advance in payment by the railroads on their capitalization had risen only from 5 per cent to 5.2 per cent, and in the further fact that it had been necessary to cut down the surplus which existed as protection from 1.8 per cent to 1.2 per cent.

It may be mentioned at this point that capital is perfectly independent. It will go into enterprises which appeal to it, and stay out of enterprises which do not. In order that it should be attracted its requirements must be met. In this particular instance, if it were necessary to figure 1 per cent on the entire capitalization of these railroads, as the measure of additional payment required by investors as the result of the tendencies noted above, the conditions would exist which were outlined at an earlier point in this discussion, where, instead of 5 per cent paid on capitalization, 6 per cent must be paid. As applied to

\$505,000 capitalization this would lead to a total cost of railroad service in 1913, which may be shown as follows:

Cost of service.....	\$74,300
Cost of capital.....	34,300
	<hr/> \$108,600

It has previously been shown in a similar instance that if the gross revenue can be advanced to meet the \$108,600 the component parts will take their proper proportion and the adjustment will again be satisfactory. In this case, however, the investors are confronted with the fact that the railroads are prevented from raising their revenue from the \$100,000 to the \$108,600. If this revenue cannot be raised, the machinery must stay out of adjustment until some forces bring about a lessening of the cost of service or the cost of capital. Pending such a readjustment, the investors prefer to withhold their capital, or invest it in other kinds of enterprise.

In attempting to look toward an adjustment, proper attention should be given to the fact that the accumulated capital expenditures made by the railroads in the last few years still await financing, existing at present in the form of short-term notes. Proper attention must also be given to the fact that the railroads, having for the most part issued mortgages on their properties, have in many cases exhausted the authorization of these mortgages and must pay for new capital on a basis of general and refunding mortgage bonds, which will be more expensive than that required by the high-grade bonds which have been sold in the past.

It must also be given proper consideration that the foregoing figures and conclusions relate not to railroads in general, but to a few selected roads of the highest credit, and represent, moreover, the conditions and problems of these roads as they existed in the year 1913. If there had been no unfavorable developments in the present year, it still appears certain that readjustments would have had to be made in order to bring the affairs of these railroads into a condition where capital would be readily obtainable. The events of 1914, and their effect upon the market for capital, intensify the conclusions reached as to 1913, and indicate that a sufficient readjustment to meet the conditions of that year would still fall short of meeting the conditions existing at the present time.

In noting the fact that these conclusions are drawn from the position of only the best railroads, it must be remembered that the readjustment necessary to maintain credit for these roads would still fail to give satisfactory credit to the average roads. Hence, such a readjustment must be regarded as a minimum for the railroad situation in general. In view of the conclusions reached, it would seem that this minimum would probably involve readjustment to a point where the return on capital—assisted by amounts of other income such as have been received in recent years—would require from 30 to 35 per cent of the gross earnings, and the cost of service from 65 to 70 per cent, as compared with an actual cost of service for 1913, as shown above, of 74.3 per cent.

It is believed that the events of 1914, following the tendencies shown in recent years, have made it possible to expect a return within any short period to the more favorable conditions of the years 1900-1909; and in view of these circumstances the railroads should seek a readjustment of rates to meet these conditions.

REPAIRS TO DAMAGED RAILWAYS IN ARGENTINA.—The Argentine government has presented to Congress a project authorizing the executive power to spend \$1,700,000 in the repair of damage caused to government lines by recent floods and a further \$850,000 to make up the deficit in operating these railways during the present calendar year. Rains and floods have destroyed many bridges and other railway properties in the provinces of Santa Fe, Catamarca, Tucuman, Salta and Jujuy. In the province of Santa Fe, where large tracts of land were under water and stations isolated, railway service on government lines is still irregular.

*Figures as of June 30 of each year.

Locomotive Tests on the Chicago & North Western

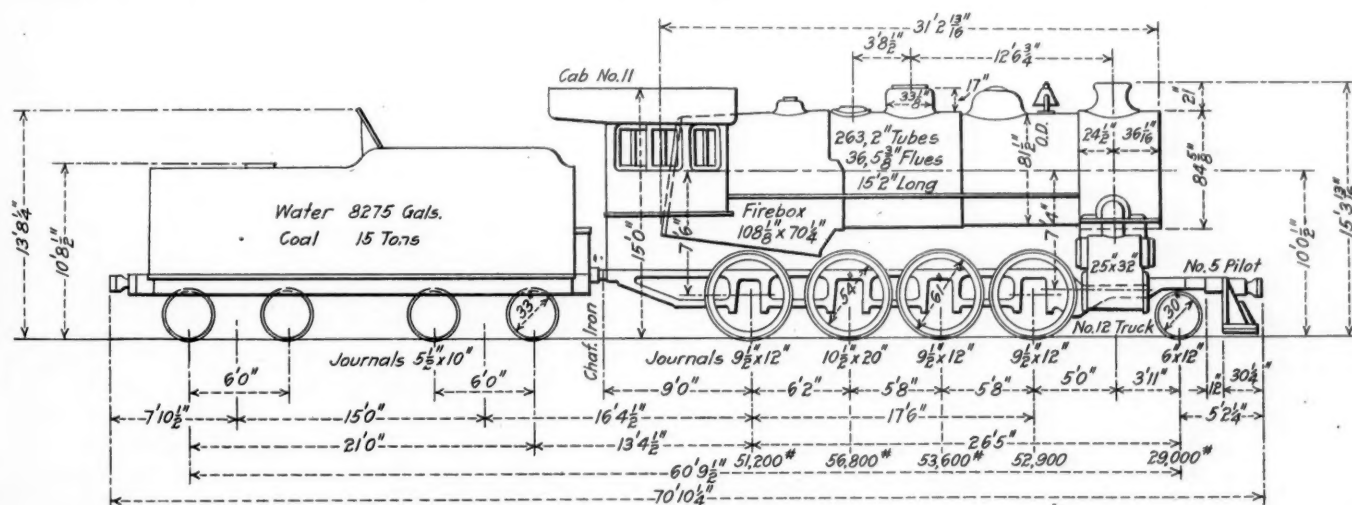
Comparative Performance of Consolidation and Mikado Over 126-Mile District with 0.7 per cent Grade

The Chicago & North Western has conducted comparative tests of Consolidation and Mikado locomotives in regular service, which showed the advantages of the Mikado locomotives for through freight service. Both types of engines carried the same boiler pressure, had the same diameter of drivers and length of piston stroke, the difference in power being obtained by a 2 in. larger cylinder for the Mikado locomotives. Two Consolidation engines and two Mikados were used in the tests, the Consolidations weighing 243,500 lb., with a tractive effort of 47,500 lb., and the Mikados 302,000 lb. with a tractive effort of 55,300 lb. The locomotives were built by the American Locomotive Company. The tests were made on the Galena division between Proviso, Ill., and Clinton. Every effort was made to have them as comparable as possible, and as will be noted in the table of results, the elapsed and running times were very nearly the same, and the mileages were practically identical.

The purpose of the tests was to determine the saving that could be made in hauling tonnage trains over this division with the Mikado type locomotive. The longest and heaviest grade

It will be noted that in the second series of tests the Mikado locomotives hauled 22.82 per cent more tonnage than the Consolidations, and in the third series the Mikados hauled 27.81 per cent greater tonnage. It will also be noted that the average drawbar pull per ton of train varied in each set of tests, although every effort was made to have conditions as nearly comparable as possible. For convenience, we will call the tests with the Consolidation locomotives, Test I; the first series of tests with the Mikado locomotives, Test II, and the second series of tests with the Mikado, Test III, as noted at the head of the columns in the table. Comparing Test II with Test I it will be seen that 4.06 per cent less coal was used, and at the same time a saving in the amount of coal per horsepower-hour of 16.81 per cent was obtained. In regard to the water, 8.31 per cent more was used, but a saving of 5.77 per cent was realized in water per horsepower-hour.

Comparing Test III with Test I it will be seen that 4.70 per cent more coal was used, but with a saving of 16.25 per cent in the coal consumption per horsepower-hour. At the same time



Consolidation Locomotive Used in Comparative Tests on the Chicago & North Western

going west is reached at La Fox, Ill., about 30 miles from Proviso. It is 1.7 miles long and has a grade of 0.7 per cent. East-bound the hardest pull is encountered at Creston, Ill., for about five miles, the maximum grade being 0.7 per cent. A dynamometer car was used to record the speed and drawbar pull of the locomotive. Three sets of tests were made; the first, with two Consolidation engines hauling an average of 2,283.88 tons; the second, with two Mikados hauling an average of 2,804.96 tons; and the third with the same two Mikados hauling an average of 2,919.13 tons. The engines used in the respective tests made two round trips, and the tonnage hauled on each of the runs varied but little from the average as given above. The following table gives the average results obtained:

	Test I	Test II	Test III
Type of engine.....	Consolidation	Mikado	Mikado
Tonnage	2,283.88	2,804.96	2,919.13
Mileage	126.09	126.62	126.15
Time elapsed, hours	7.79	7.74	7.36
Time running, hours	6.15	6.28	5.87
Average drawbar pull, lb.	9,342.6	10,706.5	11,694.5
Average drawbar pull per ton of train, lb.	4.091	3.817	4.006
Coal used, tons.....	9.864	9.464	10.328
Water used, gal.	14,325	15,516	16,486
Average rate of working, hp.	512.14	577.57	671.33
Ton-miles	287,976	355,163	368,237
Coal used per drawbar hp. hr., lb.	6.254	5.203	5.237
Water used per drawbar hp. hr., lb.	37.96	35.77	35.03
Ton-miles per lb. of coal.....	14.81	19.26	18.12
Ton-miles per gal. of water.....	20.11	22.93	22.56

15.09 per cent more water was used, although a saving was made of 7.72 per cent in the water per horsepower-hour.

Comparing Test II with Test III it will be seen that 4.07 per cent greater tonnage was hauled in Test III with an increase in the amount of coal and water used of 9.13 per cent and 6.25 per cent respectively. The coal per horsepower-hour also increased 0.65 per cent, but there was a decrease or a saving of 2.12 per cent in the amount of water per horsepower-hour. The following table gives in further detail the saving made by the Mikado type locomotive over the Consolidation:

PERCENTAGE INCREASE IN TESTS

	II over I	III over I	III over II
Pounds of water evaporated per pound of coal..	12.94	10.08	*2.63
Average drawbar pull, lb.	14.60	25.17	9.23
Drawbar pull per ton of train.....	*6.72	*2.08	4.95
Average rate of working, hp.	12.78	31.08	16.23
Ton-miles per pound of coal.....	30.00	22.36	*5.87
Average drawbar-pull-miles per pound of coal.....	19.8	19.6	*0.19
Ton-miles per gallon of water.....	14.02	11.17	*2.50
Average drawbar-pull-miles per gallon of water....	6.25	8.81	2.42

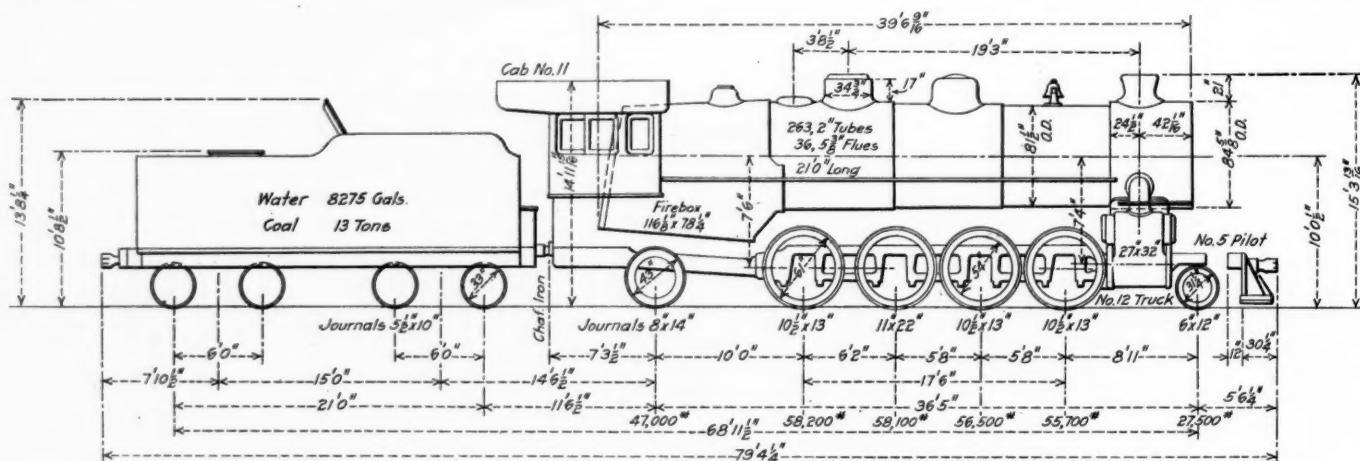
*Decrease.

The evaporation, the horsepower, and the ton-miles per pound of coal and water show a substantial saving for the Mikado locomotives. It will be noted that there is considerable difference between the percentage increase in ton-miles per pound of

coal of Test II over Test I, and Test III over Test I, which is all the more interesting when it is considered that the same engines made Tests II and III. This difference can be accounted for to a certain extent by the differences in the average drawbar pull of the train, or, in other words, the average train resistance. Therefore, if, instead of comparing ton-miles, the drawbar-pull-miles are compared, it will be found that the increase of Test II over Test I in drawbar-pull-miles per pound of coal is only 19.8 per cent, and in Test III over Test I the increase is 19.6 per cent, which shows less variation on account of the increase in tonnage.

Another important item shown in the second table is the percentage increase of the average drawbar pull of Test III over Test I, the amount being 25.2 per cent. Since there is only a difference of 16.2 per cent in the rated tractive effort of the two types of locomotive, this may be explained by the difference in their boiler capacities. According to the American Locomotive Company's method of calculation, the Consolidation has a 97.5 per cent boiler, while the same calculation for the Mikado gives 103 per cent, showing that the Mikado has a relatively larger steaming capacity. Further evidence that the Consolidation engines had more difficulty in generating the required amount of steam is shown by the fact that an average of 47.8 lb. of coal was burned per square foot of grate area per hour during the elapsed time in contrast to the Mikado locomotives burning

Ratios		
Weight on drivers ÷ tractive effort...	4.52	4.12
Total weight ÷ tractive effort.....	5.13	5.45
Tractive effort × diam. drivers ÷ equivalent heating surface.....	730	610
Equivalent heating surface* ÷ grate area	75	87.6
Firebox heating surface† ÷ equivalent heating surface,* per cent.....	6.1	5.49
Weight on drivers ÷ equivalent heating surface*	54	41.1
Total weight ÷ equivalent heating surface*	61.4	54.6
Volume both cylinders, cu. ft.....	18.16	21.18
Equivalent heating surface* ÷ vol. cylinders	218.5	261
Grate area ÷ vol. cylinders.....	2.92	2.98
Cylinders		
Kind	Simple	Simple
Diameter and stroke.....	25 in. by 32 in.	27 in. by 32 in.
Wheels		
Driving, diameter over tires.....	61 in.	61 in.
Driving, thickness of tires	3½ in.	3½ in.
Driving journals, main, diameter and length	10½ in. by 20 in.	11 in. by 22 in.
Driving journals, others, diameter and length	9½ in. by 12 in.	10½ in. by 13 in.
Engine truck wheels, diameter.....	30 in.	31½ in.
Engine truck, journals.....	6 in. by 12 in.	6 in. by 12 in.
Trailing truck wheels, diameter.....	30 in.	43 in.
Trailing truck, journals.....	8 in. by 14 in.	8 in. by 14 in.
Boiler		
Style	Straight	Straight
Working pressure	170 lb.	170 lb.
Outside diameter of first ring.....	81½ in.	81½ in.
Firebox, length and width.....	108 in. by 70 in.	116 in. by 78 in.



Mikado Type Locomotive Used in the North Western Tests

38.8 lb., and 44.5 lb. in Tests II and III respectively. The pounds of water evaporated per square foot of heating surface per hour for the elapsed time shows substantially the same difference.

In comparing the ton-miles per pound of coal and per gallon of water of Test III with Test II it will be seen that the hauling of the increased tonnage in Test III was accomplished at a sacrifice of efficiency in the amount of coal and water used. However, this decrease in efficiency will not be as large if the difference in the train resistance or average drawbar pull per ton of train is considered. Making a correction in this case, as was done before, the loss would be only 0.19 per cent in the drawbar-pull-miles per pound of coal, and there would be an increase in drawbar-pull-miles per gallon of water of 2.42 per cent.

The principal dimensions and ratios of the two locomotives tested are given in the following table:

General Data		
Type	Consolidation	Mikado
Service	Freight	Freight
Fuel	Bit. coal	Bit. coal
Tractive effort	47,500 lb.	55,300 lb.
Weight in working order.....	243,500 lb.	302,000 lb.
Weight on drivers.....	214,500 lb.	227,500 lb.
Weight on leading truck.....	29,000 lb.	28,000 lb.
Weight on trailing truck.....	.....	46,500 lb.
Weight on engine and tender in working order	409,300 lb.	467,500 lb.
Wheel base, driving	17 ft. 6 in.	36 ft. 5 in.
Wheel base, total	26 ft. 5 in.	17 ft. 6 in.
Wheel base, engine and tender.....	60 ft. 9 in.	69 ft.

Tubes, number and outside diameter...	263—2 in.	263—2 in.
Flues, number and outside diameter...	36—5½ in.	36—5½ in.
Tubes, length	15 ft. 2 in.	21 ft.
Heating surface, tubes	2,838.7 sq. ft.	3,937.3 sq. ft.
Heating surface, water tubes.....	28 sq. ft.	29.60 sq. ft.
Heating surface, firebox.....	186 sq. ft.	230 sq. ft.
Heating surface, total.....	3,053 sq. ft.	4,197 sq. ft.
Superheater heating surface.....	610 sq. ft.	890 sq. ft.
Equivalent heating surface*.....	3,968 sq. ft.	5,532 sq. ft.
Grate area	53 sq. ft.	63.1 sq. ft.

Tender		
Tank	Water bottom	Water bottom
Wheels, diameter	33 in.	33 in.
Journals, diameter and length.....	5½ in. by 10 in.	5½ in. by 10 in.
Water capacity	8,275 gal.	8,275 gal.
Coal capacity	15 tons	15 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

CHRISTMAS RAILWAY TRAFFIC IN BERLIN.—The elevated and underground railways of Berlin carried on Christmas eve and during the Christmas holidays, in round numbers, 750,000 paying passengers against 1,028,000 last year.

RAILWAY SERVICE IN BELGIUM.—The German government in Brussels has announced that from the beginning of January railway traffic in Belgium will be greatly improved. Several new trains have already been added and traffic between Antwerp and Brussels is regular, though the journey still takes two hours. The Belgian railway lines have been exploited by the German authorities since November 19.

CAR POOLING ARRANGEMENT ON INTERNATIONAL & GREAT NORTHERN AND SUNSET-CENTRAL LINES

An interesting arrangement was entered upon on October 1, 1914, by the Sunset-Central Lines and the International & Great Northern under which the freight cars of both railways are used in common, for the purpose of increasing car efficiency and decreasing operating expenses. The plan was adopted experimentally and after a two months' trial it was found that it had equalled, if not exceeded, the expectations of both parties, to the extent that it is now deemed advisable to include other carriers. At least three others have expressed a desire to join in the plan, and it is likely therefore that an expansion for trial purposes will shortly take place. A joint statement outlining the working out of the arrangement during the months of October and November has recently been prepared by J. B. Heafer, superintendent of transportation of the International & Great Northern, and O. C. Castle, car service agent of the Sunset-Central Lines.

The agreement between the two roads provides that each may use as its own the freight cars of the other; that, is those bearing the initials of the International & Great Northern, the Galveston, Harrisburg & San Antonio, the Houston & Texas Central, the Houston, East & West Texas, the Houston & Shreveport, the Iberia & Vermillion, the Louisiana Western, Morgan's Louisiana & Texas and the Texas & New Orleans. The agreement also provides that such cars may be loaded in any direction without regard to the car service rules and without incurring penalty under per diem Rule 19 of the American Railway Association. Either subscriber may include as its own, cars which do not bear its initials by filing with the other subscriber the authority of the owning road.

Each road undertakes to supply an equal number of cars under this agreement. When a road has provided an excess of cars equal to 10 per cent more than the other subscriber, the creditor road may make demand by telegraph or telephone upon the designated officer in charge of car distribution of the debtor road for an equalization within seven days, the demand to be confirmed by letter. The debtor road may then equalize by delivering to the creditor the requisite number either of the creditor road's cars or the debtor road's serviceable cars.

Failing to equalize within the prescribed period the debtor is to pay to the creditor \$2 per car per day for the excess number of cars then or thereafter in the possession of the debtor, beginning after midnight of the sixth day following the date of the written demand, and continuing until equalization is made. This rate is to be in addition to the regular per diem rate.

If the records of the creditor and debtor subscribers differ as to the number of cars necessary to the equalization, it is to be made on the basis of the average of the statement of the two subscribing roads. Payment is to be made within 30 days after the close of each month, based on actual figures ascertained by joint check. The agreement provides that it may be terminated upon 30 days' advance notice in writing served by the subscriber desiring to terminate the agreement. Misunderstandings which cannot be promptly settled are to be referred to the per diem rules arbitration committee of the American Railway Association, as provided in the case of disputes under the regular per diem rules.

The joint statement prepared by Mr. Heafer and Mr. Castle is in part as follows:

"As illustrative of the cars involved at the commencement of the plan, namely October 1, and at the close of November, the following figures are presented:

	Nov. 30, 1914	Sept. 30, 1914
I. & G. N. cars on Sunset-Central.....	469	117
Sunset-Central cars on I. & G. N.....	394	123
Bal. vs. I. & G. N.....	75	5
Bal. vs. Sunset-Central.....	75	5

"The balance is kept account of daily. Each road furnishes figures showing the number of the other road's cars on its line. This maintenance of a practical balance throughout the two

months' trial has been automatic, no demand for or offer of equalization having been made.

"From time to time local exceptions have been made to accomplish an economical distribution of cars for the two systems. For instance, at Houston the I. & G. N. received from the Sunset-Central Lines, coal cars loaded with gravel, stone, etc., for local delivery, which cars were not needed at or near Houston by the I. & G. N., and were needed by the Sunset-Central Lines. The I. & G. N., therefore, honored orders from the Sunset-Central Lines for a number of empty coal cars daily equal to the number of I. & G. N. and Sunset-Central coal cars delivered under load by the Sunset-Central Lines to the I. & G. N., at Houston, for local switching. At San Antonio the situation is reversed, coal cars being delivered by the I. & G. N. to the Sunset-Central Lines in switching service, and returned to the I. & G. N. empty on open orders. These empty returns, brought about by the local arrangements referred to, would have occurred even though the two lines had constituted one single system. These open orders are filled with cars of either ownership, which makes for economy in switching.

"As illustrative of cars interchanged in September, the month immediately preceding the inauguration of the plan, and November, under the agreement, the following figures are presented:

	November, 1914			September, 1914		
	Loaded	Empty	Per cent Empty	Loaded	Empty	Per cent Empty
I. & G. N. cars received by S.-C. L....	534	207	27.9	570	126	18.4
I. & G. N. cars delivered by S.-C. L....	472	189	28.6	217	465	68.1
S.-C. L. cars received by I. & G. N.	765	194	20.2	268	42	13.5
S.-C. L. cars delivered by I. & G. N.	521	382	42.3	103	176	63.1

"It will be noted that a striking reduction has taken place in the percentage of empty cars to the total deliveries. The delivery by the I. & G. N. of Sunset-Central empties dropped from 63.1 per cent to 42.3 per cent, and the delivery by the Sunset-Central Lines of I. & G. N. empties dropped from 68.1 per cent to 28.6 per cent.

The instructions issued by the Sunset-Central Lines governing the handling of International & Great Northern cars on the Sunset-Central Lines, signed by O. C. Castle, car service agent, with the approval of F. M. Lucore, assistant general manager, illustrate some of the details of the operation of the plan. They include the following:

1. Cars for Loading: Any I. & G. N. car may be placed for loading under the same conditions that govern the use of Sunset-Central cars. This includes loading to foreign lines when necessary.

2. Empty Cars: Good order I. & G. N. cars, when empty, will be handled the same as system cars. They will not be returned to owner unless so ordered by the car service agent, and when they are not needed for loading they will be stored at the nearest available point.

3. Bad Order Cars: Bad order I. & G. N. cars may be given the same attention as system cars, except when otherwise ordered by the mechanical department, but repair bills will be made under the M. C. B. rules the same as heretofore.

4. Acceptance from Foreign Connections: I. & G. N. cars not routing home via the Sunset-Central will be accepted from other foreign lines on special instructions from car service department.

5. Home Route Cards: The use of Form 4005, home route cards, will be discontinued on I. & G. N. cars.

6. Sunset-Central Cars Offered for Home: We will not receive our cars empty from the I. & G. N., unless they are moving under M. C. B. home route cards, for equalization or on orders for cars to load, advice of which must be received through the car service department.

7. Equalization: The car service department will keep a record of the car balance, and, when necessary to equalize, it will order the delivery or receipt of a given number of cars via various specified junctions. When such instructions are received equalization may be made in cars of either ownership or of any class, unless instructions provide otherwise.

LOCOMOTIVE SUPERHEATERS

The discussion of the report on "Steam Locomotives of Today" before the December meeting of the American Society of Mechanical Engineers brought out some interesting data on superheaters. Extracts from the discussion follow:

DISCUSSION BY GEORGE L. BOURNE

Geo. L. Bourne, vice-president, Locomotive Superheater Company: The locomotive boiler, when considered for the application of a superheater, presented many limitations that necessarily have an important bearing on the design and construction of the superheater. These limitations are more readily appreciated when it is remembered that the development of the locomotive, within certain fixed side and overhead clearances, has been dependent on the size of the boiler; that is, as the size of the locomotive has grown, each pair of wheels has been added to obtain proper weight distribution in order to accommodate increased boiler sizes. As a natural consequence of these conditions, the boiler is no larger than is absolutely necessary; in fact, in the majority of cases it is insufficient in evaporating surface and we have what is commonly termed a locomotive that is over-cylindrical.

The application of the superheater to this boiler, frequently inadequate as to heating surface, necessitates a reduction of about 15 or 20 per cent in the tube heating surface. This is occasioned by the use of the large flues in which the superheater units are located. Furthermore, a certain percentage of the gases which formerly were all available for evaporation of the water must now be used for superheating the steam, since the superheater does not provide for any increase in the maximum rate of combustion. Taking this boiler with

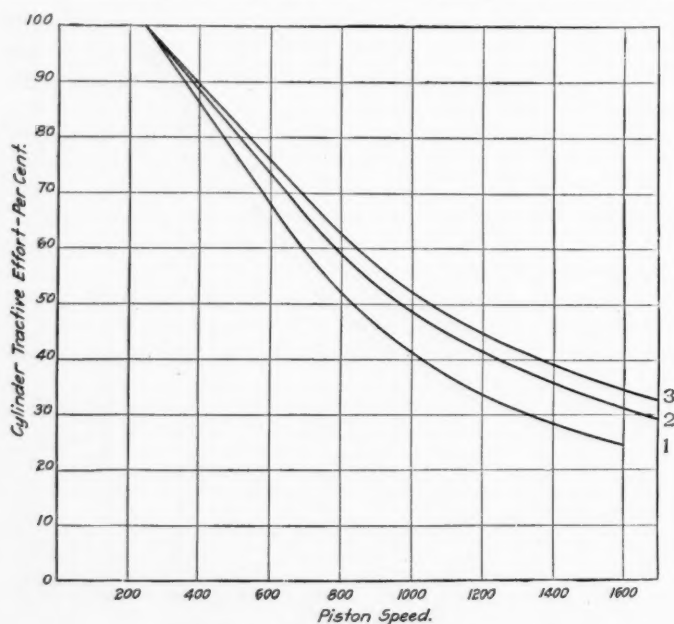


Diagram Showing Possibilities of Superheating

its deficiencies, the superheater designer has been able to produce an economy of 25 per cent in fuel, as a direct result of saving one-third of the total water evaporated per unit of power developed. As a result of this fuel economy, greater capacity of the locomotive has resulted.

As an illustration of this fact, the accompanying diagram is presented. It shows cylinder tractive effort in per cent plotted against piston speed. The lowest curve, No. 1, very fairly represents the speed factor for an average saturated steam locomotive. Curve No. 2 similarly represents the average modern superheated steam locomotive, using between 200 and 250 deg. of superheat. The greater tractive effort avail-

able is due to the fact that a longer cut-off is possible with the superheater engine at comparative speeds. The limiting factor at the usual speeds is the ability of the boiler to furnish steam.

These results have been accomplished in the face of boiler limitations, parts of the locomotive not adaptable to the use of highly superheated steam, and lack of experience in the organization which must handle the locomotive. The problems incident to these conditions are rapidly being worked out, and results shown by the superheated steam curve will soon be as basic as the saturated steam locomotive curve was a few years ago. The future then holds a possibility for further saving by increasing the degree of superheat.

The superheater engineer has only made use, thus far, of the same variety of flue sizes as was used by the locomotive designer for tube sizes. If the superheater designer is permitted the use of a size different from the two present standards, it is possible to obtain in a superheater boiler an evaporating surface practically as great as in the saturated steam boiler. The superheating surface in this case will be a net gain to the heat absorbing surface of the boiler. With a boiler and superheater thus arranged, greater capacity may reasonably be expected, and a curve approximately that shown as No. 3 may be confidently looked forward to in the near future.

Where the operation of superheater locomotives has become as much the standard practice as the operation of saturated steam locomotives was a few years ago, and where the question of coal economy is of vital importance, consideration of the possibility of reaching locomotive power to the amount represented by curve No. 3 cannot be refused. For some time past large passenger locomotives have been operated very successfully with steam chest temperatures running between 750 and 800 deg. F. Curve No. 3 is representative of locomotives using this degree of steam chest temperature, which means 350 to 400 deg. of superheat.

DISCUSSION BY C. D. YOUNG

C. D. Young, engineer of tests, Pennsylvania Railroad, stated: It has been proved that economy due to superheating increases almost directly with the degree of superheat, and the usual type of fire tube superheater produces its maximum superheat only when it is forced close to the limit of boiler capacity, these facts having been developed and recently published by the Pennsylvania Railroad in bulletin No. 24, entitled "Superheater Tests." This condition is not altogether desirable, as the maximum economy should be obtained when the locomotive is working under moderate or average conditions and at an economical cutoff. A superheater that would give a uniform superheat under all conditions of working would apparently produce ideal results.

If our materials in valves, cylinders and packing, as well as the lubrication, will withstand a certain high degree of superheat, there is no reason why we should not furnish this degree of superheat, regardless of the boiler rate, in order to effect the greatest economy in steam. With the usual Schmidt superheater we have observed steam temperatures as high as 670 deg., corresponding to a superheat of 291 deg. at the steam chest pressure, which was 180 lb., while the boiler pressure was 206 lb. With these conditions the steam rate per horsepower hour was 19.3 lb., the speed 47 miles per hour and the cut-off 50 per cent. With this superheat and a cut-off of 25 per cent it is reasonable to suppose that a water rate approximating 15 lb. could be obtained. For this reason, I am pointing out the desirability in future designs of superheaters to produce, if it is possible, a superheater that will give us a uniform superheat, regardless of the evaporation of the boiler, and until such a superheater has been produced, the maximum economy and capacity from the boiler cannot be obtained under all working conditions.

Arbitration of Engineers' and Firemen's Demands

Witness for the Employees Attempts to Show That Productive Efficiency Has Increased Faster Than Wages

The hearing before the board of arbitration on the wage demands of the engineers and firemen employed on the railroads west of Chicago, which had been adjourned over the holidays, was resumed at Chicago on January 4, and the principal witness throughout the week was W. J. Lauck, statistician for the engineers and firemen. Mr. Lauck's testimony was based mainly on a series of elaborate statistical exhibits. He said the engineers and firemen never have conceded that the settlement of 1909 and 1910 was full, complete or satisfactory. "It was simply the best we could get at that time under the existing conditions," he said, "and without resorting to the drastic measures of a strike, so that the question before this board today is not an arbitration of the conditions of 1914 over 1910, but of questions that have been in dispute since 1890."

Warren S. Stone, grand chief of the engineers, said it was proposed to show by these exhibits that during the past 24 years the western railroads have made remarkable gains in productive efficiency, which have been followed by a threefold effect upon engineers and firemen, increasing their labors and responsibilities, increasing their productive efficiency, and reducing their earning capacity even at the increased rates of payment. He said that the tendency is to add still further to the trainloads and make still further increases in the labor and responsibilities of the engineers and firemen, and that the revenue gains arising from the advances in efficiency have been sufficiently great to pay all increases in operating costs, as well as reasonable returns on additional capital investment, and in addition to leave an ample surplus to remunerate engineers and firemen. He said it was expected to show also that the increased operating costs have not been due to additional outlays for labor, and that as a matter of fact labor costs of operation have actually declined.

The witness first introduced three exhibits entitled "Increased Work and Productive Efficiency of Locomotive Engineers and Firemen," for the periods 1890 to 1913, 1900 to 1913 and 1909 to 1913. The comparative statement for 24 western roads from 1890 to 1913 showed that freight ton miles had increased 343 per cent, ton miles per freight train mile 163 per cent, freight train miles 68.8 per cent, and coal consumed 305 per cent, while the ton miles for each \$1,000 of outlay for engineers, or their "productive efficiency," had increased 161 per cent, and for firemen 141 per cent. The number of engineers and firemen in freight service had been obtained by dividing the total number in freight and passenger service on the revenue train mile basis. Comparing 1900 with 1913 the exhibit showed that the ton miles per \$1,000 compensation to freight engineers had increased 18 per cent and to firemen 14 per cent, for 40 representative western roads. Comparing 1909 with 1913 the exhibit showed that the ton miles per \$1,000 compensation to freight engineers had increased 4.68 per cent, and in the case of freight firemen had increased 4.55 per cent, for 78 representative western railroads. "This exhibit shows," he said, "that freight train, freight locomotive and total revenue train mileage have not increased proportionately with other factors. As a consequence, although the rate of pay per locomotive mile may have increased, the earnings of employees are smaller now than formerly because of the impossibility of making more mileage."

Mr. Lauck was questioned at considerable length by members of the board of arbitration as to his views as to how wage increases should be related to the "productive efficiency" of the men and of the roads. He thought the men ought to share in the increased productivity of a road, and that in the case of "an economic advancement" labor should participate in the productive gain, even though it may be an unearned increment, but in the case under discussion he thought increased requirements had

been placed upon the men and that they have a reasonable ground for requesting to participate further in results of the productive efficiency which had grown out of the co-operation of both labor and capital. He said he did not believe in leveling up people by the force of bargaining power, but that if standardization were based on the size of the engines and applied to average conditions a man would be required to perform the work required by the size of his engine, that the railroads should see to it that they do not have men below the average of competency, and that an unusually efficient man should be compensated in some way for his increased efficiency.

James B. Sheean, attorney for the General Managers' Conference Committee, asked if there should be some consequent reduction in the pay of men because of decreased efficiency in the passenger service. Mr. Lauck replied that he did not think the engineers should be held responsible for the lack of productive efficiency, if the railroads through competition ran too many passenger trains. That was a condition over which the engineer had no control.

Mr. Lauck's exhibits also gave figures for individual roads and groups of roads as to increases in efficiency, but by applying the same methods to the operations of the Chicago, Rock Island & Pacific it was shown that notwithstanding the increased efficiency of the road the ton miles per \$1,000 outlay for engineers and firemen had decreased. Mr. Sheean asked many questions in the effort to bring out why this condition existed, and the witness said he was unable to give any satisfactory explanation, except that there was something the matter with the financial management. The Rock Island for the period 1890-1913 showed an increase in freight trainload of 106 per cent, an increase in ton mileage of 302 per cent, handled by an increase in freight train miles of only 73.27 per cent, but there was a decrease in the number of ton miles hauled per \$1,000 of outlay for engineers and firemen.

In an exhibit on "Revenue Gains Arising from Increased Productive Efficiency," Mr. Lauck gave figures to show, for 24 representative western railroads, the increased cost of engineers and firemen and revenue gains per revenue train mile from 1890 to 1913. These showed that while the cost of engineers had increased 2.20 cents per train mile and firemen 1.59 cents, and the total cost of engineers and firemen 3.79 cents, total operating expenses per revenue train mile had increased 68.53 cents, and total operating revenue 95.4 cents, making a net gain in operating revenue of 26.87 cents per revenue train mile. "The increased productive efficiency of labor and capital engaged in conducting transportation on these railroads, therefore," he said, "not only reimbursed the company for added costs but also yielded a handsome profit. It is at once evident that reasonable wage increases to enginemen would absorb only a very small portion of the net gain realized during the period under consideration." In an exhibit giving similar figures for the period 1900 to 1913, he showed an increased outlay per revenue train mile for locomotive engineers and firemen of 4.08 cents. During the same period there was an increase in total operating expenses of 57.46 cents, and in operating revenues per revenue train mile of 73.48 cents, leaving a net gain in operating revenue over and above all additional expenses of operation for 48 representative western roads of 16.02 cents. Mr. Byram commented on the fact that in these tables he had figured increases in cents instead of in percentages. Another exhibit gave the same comparisons for 1909 to 1913.

Three exhibits entitled "Increased Operating Costs of Western Railroads Not Due to Wage Payments to Locomotive Engineers and Firemen," covered the periods 1890 to 1913, 1900 to 1913, and 1909 to 1913. The first exhibit showed that the ratio of total

cost of engineers and firemen to total operating expense in 1890 was 9.89 per cent. In 1913 the proportion was 8.06 per cent. Mr. Sheean showed, however, that there had been a considerable change in the accounting methods affecting operating expenses during the period. The exhibit comparing the years 1909 and 1913, showed that total labor costs constituted a larger proportion of operating expenses in 1913 than in 1909, but Mr. Lauck said that the advance was not due to added outlays during this period for engineers and firemen. The ratio of the cost of engineers and firemen to total operating expenses was given as 7.85 per cent in 1909, and 7.94 in 1913. Moreover, the ratio of the cost of engineers and firemen, as well as the ratio of the total labor cost of transportation to the total labor cost of operation, he said, was less in 1913 than in 1909. The advance in labor costs, he said, has been primarily due to additional payments to labor engaged in maintenance work.

Mr. Lauck was asked both by Mr. Sheean and by Mr. Nagel whether, on account of the increased efficiency of a road, employees should receive additional compensation, whether or not they were employed in the department in which the increased efficiency was shown, or whether or not they personally contributed to the increased efficiency. He cited the case of the Ford Motor Company as one of remarkable productive efficiency developed by managerial ability, in which a large part of the profits were distributed among the employees, although he said, they probably did not contribute very much to the increased efficiency. "If we are going to have industrial progress," he said, "we ought to give participation to the worker after a fair remuneration has been given to capital for risk and managerial ability."

One exhibit was made up of quotations from the article published in the *Railway Age Gazette* of April 10, 1914, on "The Possibility of Future Increases in Train Loads," which the witness said was to show that the railroad presidents expect a further increase in freight trainloads.

An exhibit entitled "Revenue Gains by Representative Western Railroads Available to Compensate Locomotive Engineers and Firemen for Increases in Work and Productive Efficiency," showed that for 43 representative western roads the average gross corporate income per year had increased for the five years ending with 1913 over the five years ending with 1908, by \$122,321,295, and that after subtracting \$26,116,487 for "deductions except interest on funded debt and appropriations for reserves, etc.", there was left \$96,204,808 a year, which the witness called "net amount available for distribution to capital because of additional investments; to labor because of increased efficiency, and to reserves for emergency purposes." Of the \$96,000,000 the witness allowed 48 per cent, or \$45,663,679, "for a fair return to capital for additional investment, at 4 per cent," but in obtaining the "additional investment" he subtracted from the expenditures for road and equipment the amount appropriated from income, which was \$89,912,702. The remaining 52 per cent of the \$96,000,000, or \$50,541,120, the witness said was the "balance remaining to compensate increased labor efficiency and to appropriate for reserves." If an advance of 10 per cent be allowed on the total labor costs for engineers and firemen on these railroads during the year ending June 30, 1913," he said, "it would amount, approximately, to only \$6,748,600; an advance of 15 per cent to only \$10,122,900; of 20 per cent to \$13,497,200; and of 25 per cent to only \$16,871,500. It is, therefore, clear that even if capital, including commitments made from earnings during the five years, 1908-1913, were allowed a much larger return than 4 per cent, there would still be an ample amount of net revenues remaining to grant reasonable advances to engineers and firemen and other classes of labor."

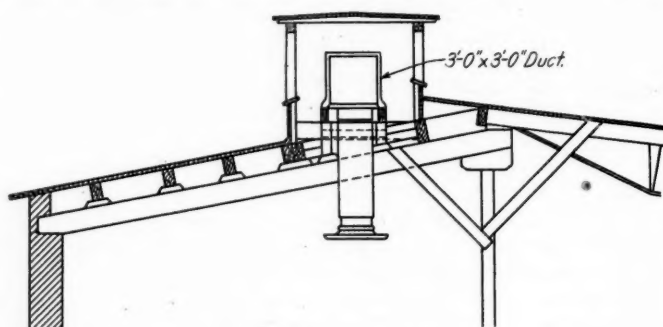
Mr. Byram asked how much of the \$50,000,000 the witness thought should go to the engineers and firemen, in view of his statement that their productive efficiency had increased about 5 per cent in 1913 over 1909. Mr. Stone interrupted and said that there "would still be plenty for the board to divide up after allowing for necessary reserves."

SMOKE EXHAUSTER FOR THE ST. PAUL ENGINE HOUSE AT CHICAGO

By W. S. LACHER

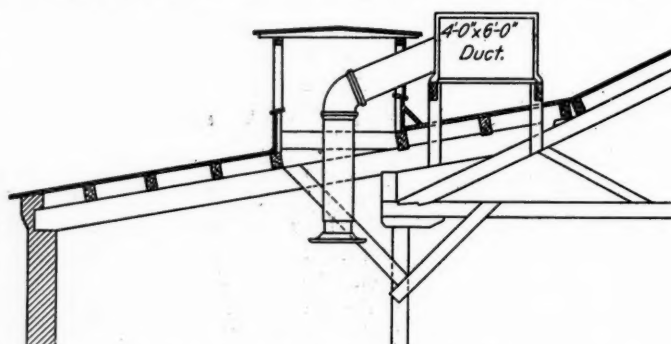
Office Engineer, Chicago, Milwaukee & St. Paul, Chicago, Ill.

The Franklin boulevard engine house of the Chicago, Milwaukee & St. Paul is located, as the name suggests, on a boulevard of one of the park systems in the city of Chicago and within a short distance from a high grade residence district. The house



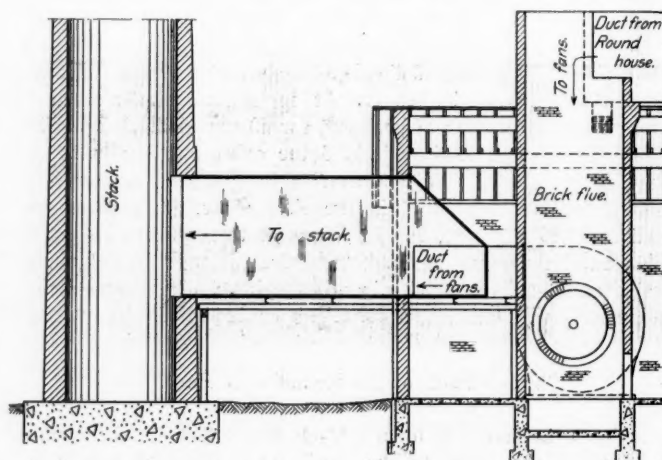
Section Through New Part of Roundhouse

contains 35 stalls and is used almost exclusively for passenger locomotives, the smoke from which is greatest in the early hours of the afternoon when the engines are being fired-up for through and suburban trains departing from Chicago between 5:00 and



Section Through Old Part of Roundhouse

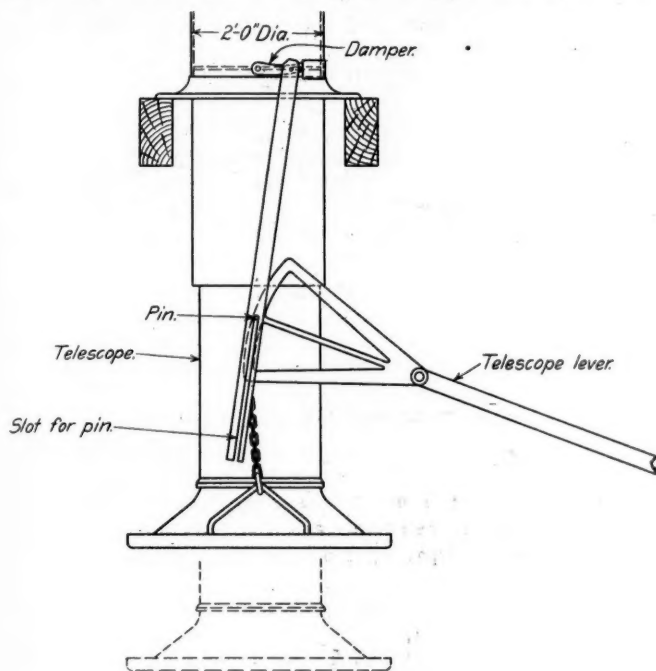
7:00 p. m. In order to overcome this nuisance it was decided to install a plant for diluting the smoke by means of steam and air, at the same time retaining the soot within the plant.



Section Through Fan House and Chimney

The equipment consists of a system of ducts for collecting the discharge from the various smokejacks, two exhaust fans, a chimney to discharge the gases at a good height above the street,

and dampers for all smokejacks so that they may be shut off when not in use, thereby reducing the load on the fans. Non-corrosive material was adopted for all parts of the apparatus where practical. The ducts are of cast iron, the blades of the fan are made 50 per cent thicker than the standard and the chimney and smoke flues are of brick. The fans and chimney are located outside of the roundhouse, about equi-distant from each end, which made it necessary to have two branches of



Automatic Damper for Smoke Jack

ducts. These vary in size, diminishing as they get farther from the stack. The roundhouse consists of an old section, with a new section added to each end. It was necessary to place the smoke ducts for the old section on the roof, as indicated in the drawing, but in the new sections they are placed in the monitors. It has been found that the cold winter air will condense the steam conducted through the exposed ducts, and the water



Smoke Ducts on the Roundhouse Roof

mixing with the soot will form a black fluid which leaks through the joints of the ducts to the roof; on account of this it is planned to house them in.

Various materials were considered for the construction of the ducts, including steel sheets or plates, reinforced concrete, vitrified pipe, metal lath and plaster, asbestos boards and cast iron. The latter was adopted, the considerations affecting the selec-

tion being permanence, first cost, strength and weight to be carried. The ducts were manufactured and erected by the Paul Dickinson Company, Inc., Chicago, from its own detail plan, based on the general plan supplied by the railway company. They are provided with expansion joints at proper intervals. These ducts terminate in a brick structure, as shown in the photograph, which is provided with two flues, one for each branch of the ducts. The partition between these flues extends below the level of the fans, one fan being connected to each flue. Dampers are arranged in the flues so that the fans may be used either together or alone.

The fans were made by the New York Blower Company and have a rated capacity of 46,000 cu. ft. per min. at a speed of 206 r. p. m. They discharge into a duct which leads to a radial brick chimney, 10 ft. in diameter and 100 ft. high. Above this duct a 1¼-in. steam pipe, which feeds a perforated coil with live steam, is tapped into the chimney. This has been found necessary in order to sufficiently dilute the smoke. Automatic dampers, as shown in one of the illustrations, are provided at each of the smokejacks; these open and close automatically with the raising and lowering of the jack. The damper will open with 3 in. initial downward travel of the jack, the mechanism being so arranged that it will not interfere with the lowering of the jack to its full travel.

The plant was placed in operation about a year ago, and experience has shown that it is quite necessary to have the dampers closed when the jacks are not in use in order to properly catch all the gases from the smoking engines. The nature of the discharge from the chimney varies with the number of engines smoking and the quantity and density of the smoke from each. In winter it has the appearance of white or dirty-white steam. As there are still some complaints from the residents in the neighborhood it has been recently decided to install a smoke-washing device in the chimney, the details of which are still in a preliminary state. As anticipated, there is an accumulation of soot in the ducts, but as yet it has not been found necessary to remove it. Manholes are provided in the ducts at each stall for this purpose. No deterioration of any part of the plant has been noted thus far. The engineering department of the Chicago, Milwaukee & St. Paul, under the direction of C. F. Loweth, chief engineer, designed the plant and supervised all of the construction work.

REPORT OF THE DIVISION OF SAFETY, I. C. C.

The Interstate Commerce Commission has issued a pamphlet of 44 pages containing the annual report of H. W. Belnap, chief of the division of safety. The inspectors of the division during the last fiscal year inspected 790,822 freight cars, 26,746 passenger cars and 32,761 locomotives. The percentages found not complying with the laws in regard to safety appliances are exceptionally low. The usual tables are given showing the percentages of each class of defect; and roads on which 500 or more cars were inspected during the year are shown in a separate table, giving the number of defects of each kind found on each road. A similar table, by roads, gives the results of terminal tests of air brakes, in trains. A fifth table shows the amounts of penalties paid, since the enactment of the safety appliance laws, and up to October 1, 1914, by all roads, for violation of the safety appliance laws. These amount to \$643,844. This list names about 275 roads.

The inspectors find that many roads are not diligently fitting their cars, as required by law, so that by July 1, 1916, they will conform to the safety standards prescribed by the commission. The report recommends that all carriers be required to report the condition of their cars, in this respect, every three or six months.

The report discusses difficulties at points where freight cars are interchanged between roads, and intimates that the inspectors at these places do not always have a sufficiently thorough knowledge of the safety appliance acts and of the orders which

the commission has issued concerning their administration. The use of conductors' valves and air gages in cabooses is increasingly important, because of the increasing length and weight of trains. This part of the report ends with the declaration that the railroads generally have manifested "an admirable spirit of co-operation which has contributed immeasurably to an effective administration of the law."

The division of safety investigates automatic train stops and other inventions presented to the commission, following the plan that was in vogue during the life of the Block Signal and Train Control Board, which was abolished in 1912. Out of a large number of devices presented the Division has examined 184, and opinions regarding them have been transmitted to the proprietors. Of these devices 22 were held to possess merit sufficient to warrant experimental tests, provided the proprietors should present installations prepared free of cost to the government. Of these 22 devices, seven are automatic stops presented by the following: Willson-Wright Safety Appliance Company, Spokane, Wash.; Automatic Train Control & Signal Company (Gray-Thurber), Pittsburgh, Pa.; A. D. Pond, New Britain, Conn.; Railway Automatic Safety Appliance Company, Philadelphia, Pa.; Jones Safety Train Control System Company, Baltimore, Md.; Gollos International Automatic Train Control & Recording Co., Chicago, Ill.; B. F. Wooding, Denver, Colo. Automatic train pipe connectors were presented by J. R. Cobb, Los Angeles, Cal.; Furbin Automatic Train Pipe Connector Company, St. Louis, Mo.; W. C. White, Baltimore, Md. Other inventions in the list are a car coupler, a gasket for hose coupling, an air-brake system, a rail brace, a side-clearance telltale, etc. The Division has made favorable reports on the Gray-Thurber automatic stop and the Robinson connector. The automatic stop of the Jones Signal System Company of Atlanta, Ga., was tested, but without favorable results. The Miller automatic stop on the Chicago & Eastern Illinois was inspected last March.

The report includes a dozen pages of matter which has already been published, in the annual report of the commission.

ELECTRIC TRAIN STAFF ON THE CANADIAN PACIFIC

By E. S. TAYLOR

Assistant Signal Engineer, Canadian Pacific, Montreal

The Canadian Pacific has in service a number of installations of electric train staff on single-track sections where traffic is heavy, notably on the Lake Superior division, which is not completely double-tracked and where the staff system was installed on all single-track portions in order to eliminate the delays and inconveniences due to the use of train orders. On other sections, for the purpose of providing for certain junctions and intermediate sidings, several modifications have been devised.

The staff instruments are type S miniature instruments, made by the Railway Signal Company, of Liverpool, England. Metallic circuits are used, and to prevent the possibility of a careless maintainer reversing the polarity, current for the operation of the instruments is furnished by magneto-generators equipped with two taper keys, so that one magneto provides current for the block on either side of the station. These keys are mechanically interlocked to prevent the current from being sent in both directions at the same time. Each instrument is equipped with an indicator showing "staff out; line blocked," when a staff has been withdrawn from either instrument, and "staff in; line clear," when no staff is out. The train staffs are made in such a manner that it is impossible for the staff belonging to one block to be inserted in the instrument of an adjoining block. Permissive movements are made by means of a staff which is divisible into two parts. These parts must be screwed together before the staff can be replaced in the instrument. The capacity of each instrument is 40 staffs, and at stations where the permissive feature is used, 20 of these are divisible. Each station has a telephone, which is worked over the staff line wire.

On staff sections where there are few train movements at night, an "automatic operator" has been installed. A stick relay, the armature of which is balanced and on which there is one

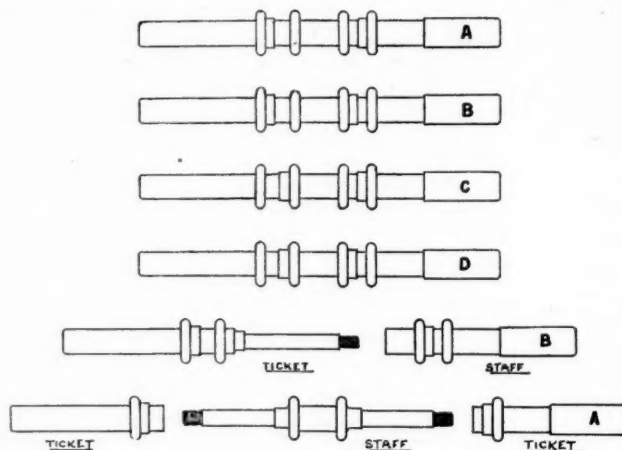


Fig. 1—Divisible Electric Train Staff

normally closed and one normally open contact, the other members of these contacts being on pivoted weights, provides the automatic feature. When the relay is energized the armature is rotated in a direction to cause it to lift the weight

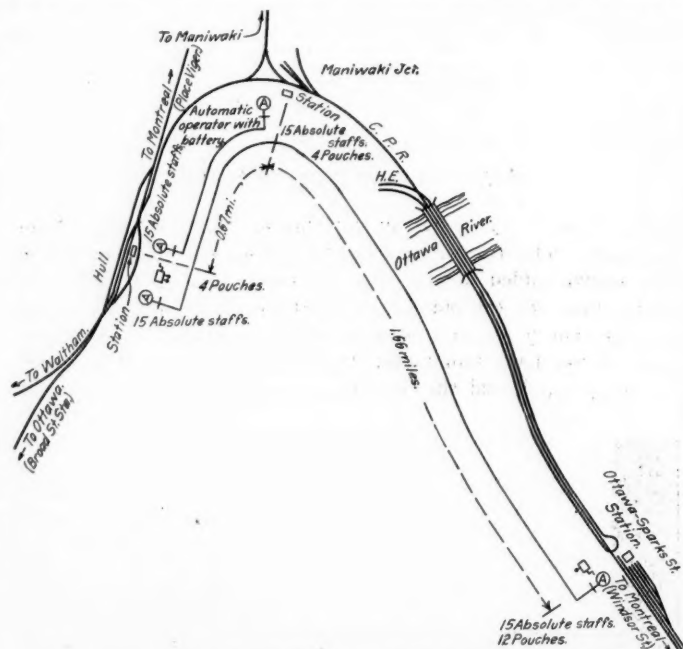


Fig. 2—Hull-Ottawa Staff Section

on which the normally closed contact is fixed, and when current is broken, the weight causes the armature to rotate in the opposite direction a sufficient distance to close the

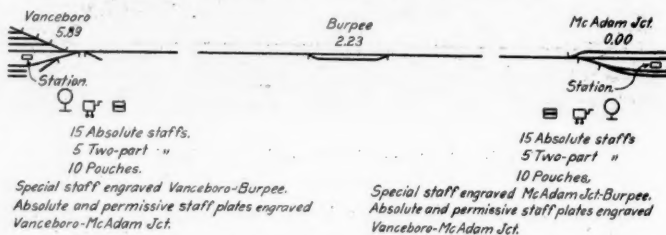


Fig. 3—McAdam-Vanceboro Staff Section

other contact and cut in a local battery which energizes a coil to release the staff at the opposite end of the block. It is possible to operate a staff block without an operator at either station, by using this attachment at both ends.

In a staff block between Hull and Sparks street station, Ottawa, it was necessary to install an auxiliary pair of instruments at Manawaki Junction on account of a branch line connecting at that point. The four instruments are alike and a staff from one may be deposited in any other; and a train obtaining a staff for this block may move between any two of the instruments. When all staffs are in the instruments one or the other of the two pairs of instruments is out of phase, and a staff can be obtained only from the pair which is in phase. Thus when a train starts from one block instrument, having taken a staff out of the only pair which is in phase, this throws the remaining pair of instruments out of phase at the opposite end of the block so that no staff can be obtained at that end. This arrangement could be used with a greater number of auxiliary pairs.

A special staff block has been installed at Burpee, between McAdam Junction, N. B., and Vanceboro, Me. When it is desired to have two trains meet at Burpee, special staffs are used. At McAdam, which is the initial station, a special instrument is provided, having two drawers. The top drawer, containing the special "passing staff," is mechanically locked in the closed position, while the bottom drawer is normally open and cannot be closed until a regular staff has been inserted. At Vanceboro, a similar instrument is provided, but the top drawer is normally open. This is called the dummy drawer, as it is used only for the operation of the circuit controller and no staff is ever placed in it. The bottom drawer contains the special passing staff and is mechanically locked in a closed position.

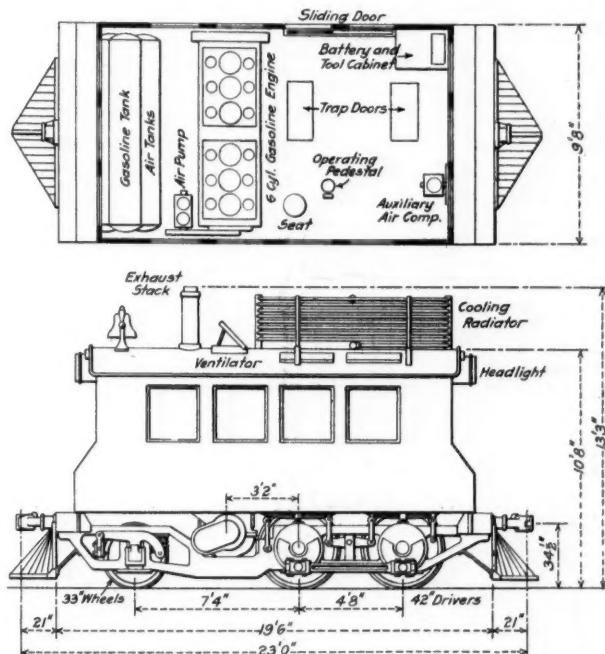
To obtain the special passing staff McAdam, the "initial" station, first withdraws an ordinary staff and inserts it in the bottom drawer of the special instrument at that station. The drawer can then be closed, which mechanically unlocks the top drawer, from which the special passing staff can then be taken. Opening the top drawer operates the circuit controller which connects one of the keys of the magneto-generator to the line wire, operating Vanceboro's special instrument. Vanceboro then closes the dummy drawer, which operates the circuit controller on that instrument, cutting in the lock-coil which releases the drawer at McAdam containing the special passing staff. McAdam then unlocks the bottom drawer at Vanceboro by turning the handle of the magneto. Both special staffs and a regular staff have now been withdrawn from their respective places, but the regular staff is locked in the drawer of the special instrument at McAdam. The special passing staffs are then delivered to the trains which are to pass at Burpee. These staffs confer right only to that station. When the two trains reach Burpee, they exchange staffs, and proceed. The special staffs are thus always returned to the stations from which they were originally issued.

A pusher staff is provided for the use of an engine assisting a train through a portion of a block. The instrument provided for this purpose has two drawers, one of which is open and the other, containing the special pusher staff, mechanically locked in the closed position. The regular staff is withdrawn and deposited in the open drawer of the pusher attachment and the drawer closed, which mechanically releases the other drawer. After the pusher staff is withdrawn, the regular staff is again withdrawn. The opening of the pusher staff drawer opens the line circuit; and when the pusher returns and replaces the pusher staff and closes the drawer, the line circuit is closed; and the regular train, continuing on to the instrument at the opposite end of the block, inserts the regular staff at that point.

OIL FOR RAILWAY FUEL IN HONDURAS.—The Vaccaro Bros. & Company Railroad, operating from Ceiba into the banana lands, has equipped one locomotive for burning oil instead of coal, the present fuel, to ascertain the desirability and economy of oil as a fuel. If the experiment proves a success, it is possible that not only the locomotives but the shops and various kindred enterprises controlled by this company will be equipped for the use of fuel oil.

GASOLENE SWITCHING LOCOMOTIVE

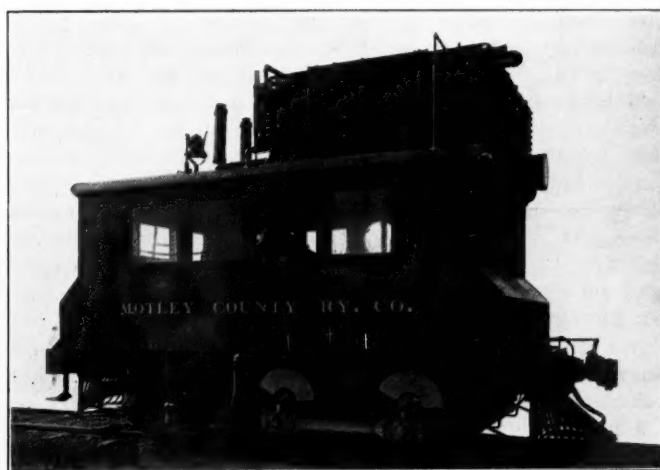
The Motley County (Tex.) Railway recently purchased a 300-horsepower gasolene switching locomotive from the McKeen Motor Car Company, Omaha, Neb., to be used in freight and switching service between Roaring Springs Junction, on the Quanah, Acme & Pacific and Matador, Tex. It has a tractive effort of 12,000 lb. at a speed of six miles an hour, and is mounted on six wheels, four of which are driven by a six-cylinder, Type C,



Gasolene Switching Locomotive of 12,000 lb. Tractive Effort

gasolene engine, having cylinders 11 in. by 15 in. The frames are of cast steel, and the cab is an all-steel structure extending the entire length of the locomotive. The usual locomotive type of spring suspension with equalizers is used to transfer the weight to the wheels.

The engine bed is attached to the side frames, acting as an efficient brace and reinforcement. It is of the company's latest



McKeen Gasolene Switching Locomotive for the Motley County Railway

model, being provided with an increased water circulation around the valves and cylinder head, tungsten steel valves, triple piston rings and water-jacketed intake pipes. Special provision has been made to enclose the flywheel, crank case, cam shaft, water and air pump driving mechanism. The engine is lubricated by a combination splash and automatic lubricating system.

All the gears are of the herringbone type. The engine is equipped with an air-reversing mechanism and straight air brake, and is also provided with a Gregory brake valve by which the automatic brakes on a train may be operated. Compressed air is provided by two 5-in. air compressors attached to the engine crank shaft. In addition to this there is an auxiliary air compressor in the cab for emergency service.

The forward and intermediate wheels form the driving unit, being connected to each other by side rods, as shown in the illustration, counterbalance crank disks being applied to each pair of drivers. The power from the engine is transmitted by a Morse chain to a sleeve which runs free on the rear driving axle. This sleeve is connected to a sprocket wheel by a multiple-disk friction clutch, also provided with a Morse chain for driving the forward axle, where, by means of an octocoon clutch, the power is increased through gears to produce the heavy tractive effort required for starting. After starting the gears are cut out and the power is delivered direct to the driving wheels. The clutches are operated by compressed air.

Locomotives of this type have a field in many locations on a railroad where but little switching is required. With a gasoline switching locomotive, the cost of fuel will be in direct ratio to its time in use. Its availability for the 24 hours will not cost any more than its availability for six hours, whereas it would be necessary to maintain steam pressure on steam switching locomotives in most cases at an excessive cost. Following is the table of dimensions of the gasoline switching locomotive:

Gage	4 ft. 8½ in.
Driving wheels, diameter.....	42 in.
Driving wheel base.....	4 ft. 8 in.
Total rigid wheel base.....	12 ft.
Length over bumper beams.....	19 ft. 6 in.
Length between pulling faces of couplers.....	22 ft. 5½ in.
Length over-all	22 ft. 11½ in.
Height, rail to top of exhaust pipe.....	13 ft. 3 in.
Height, rail to top of cab.....	10 ft. 8 in.
Width over cab.....	9 ft. 8 in.
Width over cab eaves.....	10 ft.
Center to center of frame.....	6 ft. 9 in.

A FORMER RAILROAD COMMISSIONER'S VIEWS ON PASSENGER FARES

C. V. McAdams, of Lafayette, Ind., who was a member of the Indiana Railroad Commission before that body was succeeded by the Indiana Public Utilities Commission, and who aided in drafting the two-cent passenger fare law now in effect in Indiana, has written a letter to the Indianapolis News giving reasons why he believes the passenger fares in the state should now be advanced. The letter is, in part, as follows:

"I hold no brief for the railroads. I was never and am not now employed by any railroad. I am under no obligations to them nor they to me. I spent three years in the state's service (at too low rates) trying to do my duty as a railroad commissioner, not only to the state, but to the railroads. Most of these three years was devoted to rates and rate conditions. During this time I came to some definite conclusions about passenger rates on steam railroads in this state. Time has not changed, but has more deeply impressed the conclusions at which I had then arrived. I think I should now speak and I do so with the same sense of responsibility that I was then under, although I voluntarily quit the state's service.

"First, I am thoroughly convinced that the passenger rates on steam railroads should be increased by some reasonable and appropriate legislation. Second, that they should not be increased in the manner and method pursued in the 2-cent fare act of 1907.

"The reasons justifying increased rates are numerous, well founded, and for many of them the public, who must pay the increase, is directly responsible. Almost all the recent improvements forced upon the railways by state legislation came about from a consideration of the passenger traffic as viewed by the public. Each collision or other accident tends to arouse the public, and this is so because they look to the safety of the public when traveling. The public generally, does not concern itself

greatly about the safety of train crews or their movement, other than as it affects passenger traffic.

"The public, therefore, has, and justly so, demanded greater safety, and this demand has been met and is being met by the railroads, partly voluntarily in response to the public demand, and partly in response to legislation enacted at the demand of the public.

"These things have all come to pass in the last 10 years, and during that time the rates were reduced notwithstanding these additional burdens. In addition to these added expenses, during the same time economic changes and the action of labor bodies have added other burdens, namely, the wages of all railway employees have been greatly increased, and the cost of railway equipment has also largely increased and there has been a tremendous advance in the cost of the millions of dollars' worth of materials which the railroads must buy annually to maintain their ways and structures in a safe and usable condition. These latter, increased costs of labor, equipment and supplies, are the direct result of economic changes which have affected all the industrial and producing life of the country during this period.

"Although I aided in drafting the 2-cent fare law now in effect, I can truthfully say that, in my judgment, as I now and for years have seen things, a more crude, inelastic and unsuitable piece of legislation was never enacted. It was a misfit from the start. The passenger service of a railroad is indicative, so to speak, of the aristocracy of the line, while its freight service is the barometer whereby you determine its efficiency as a railroad, and its capacity as a dividend payer to the people who own it.

"The measure of a railroad's opportunity is the density of its available traffic. The measure of its responsibility is an efficient service to move that traffic. The efficient service is due to all communities and on all the lines. It can be and is enforced by law. The density of the traffic is controlled by the state's development. It can not be added to nor taken from by law or the action of the commission. If the road operating in a sparsely settled country has an efficient service and is given an income upon its property, the same as a like efficient road operating in a densely settled community, then there must be a different rate adjustment on these two lines and these two communities. Nothing in economics can be more simple and plain than this proposition.

"The railroads many years ago did things that don't look well in print. They were manipulated for the private gain of the officers and to help their especial friends over the line. That day has passed in Indiana. They are now under absolute control and are managed by a class of honorable and conscientious men who are doing their best, under distressing conditions, to weather the business depression, preserve their properties and perform the public service. It is suicidal to badger or buffer them about. The railroad interests in the state constitute its greatest enterprise which is controlled by legislation. Their every act is subject to the control of the Public Service Commission, a body created by law and constituted of able, honest and hard working men in whom the public and the railroads have confidence.

"In view of these conditions, the assembly, without a dissenting vote, should enact a law permitting an increased passenger rate on steam lines in Indiana. This law, however, should provide that after a petition is filed, notice given and a hearing had the Public Service Commission should have authority to authorize rates in advance of those created by the act and reduce those created by the act. Such a law would be in keeping with the law of the federal government and of the state which regulates the freight rate business, which is of vastly greater volume and importance, and such laws have proven effective and are satisfactory.

"Under such a law the short and poorly patronized line can have a remedy to meet its situation and if times again become prosperous and business grows and people travel the public can also go before the commission and ask to have the trunk line

rates reduced. All that has ever been said in favor of a tariff commission can be truthfully said in favor of such a law. It should be elastic and subject to changes to meet different situations and changing conditions.

"Another view of the passenger service is worthy of consideration. There is a continuous demand for a finer, safer and better equipment; a more speedy service, with fewer stops; Pullman cars, electric lights, diners, observation cars, barber shops, bathrooms, drawing rooms, valets and servants. This demand is being met. Mobile hotels dart across the state in a stream of light at aeroplane speed on a nonstop schedule. The people who demand this service should be and are willing to pay for it. It can not in reason be furnished for all the business of the line. It has come to meet a demand. The demand should respond to the service. I can see no reason why authority should not be given by the commission to operate an excess fare train or trains on any of the trunk lines where conditions and the service warrant it.

"It is a rule of commerce and business the world over to pay in accordance with what you get. The hotel, the restaurant, the merchant, the doctor, the lawyer, the barber and candlestick maker all charge you for what you get in merchandise or accommodation or service—why not the railroad? Those who demand should pay for the extra service.

"I should make the public pay extra for what it demands in the shape of excess speed, nonstop trains, elegant equipment and high cost modern refinements. He who wants the Twentieth Century Limited must have the twentieth century price or take a slower train; then why not make him who jaunts with the White City special be white with the railroad? Why not make him who joy rides on the Royal Palm come along with the revenue to pay for it? Why not make him who glides with the Hoosier limited put up something for the elegance, comfort and speed of his journey? Why not bring the twenty-four-hour St. Louiser across with something to make him remember that he has been safely, elegantly and speedily carried from Terre Haute to Richmond? Why should the Continental limited speeder object to a limited charge for his limited ride? Why should the Knickerbocker knock on being held up for extras?

"Yet all these folks travel at the same price under our senseless law and regulations as the man pays who bumps and bangs from Attica to Covington and he who is jerked into Corydon on the B. & O., or he who rides the chute-the-chutes on a hundred different spur and branch lines in this good state.

"There is no sense or justice in it, and it should be stopped."

THE BOSTON & MAINE SITUATION

The following is an abstract from the inaugural address of Governor Walsh of Massachusetts in regard to the Boston & Maine:

The condition of the Boston & Maine is the gravest question in our ever-present transportation problem. That railroad system still remains in its unstable state, whereby the stockholders of the Boston & Maine have but a small equity in the whole Boston & Maine system. The fluctuations in railroad prosperity thus fall with crushing weight upon a very small portion, when, with a sound financial structure, the weight would be borne equally by the whole. About 80 per cent of the Boston & Maine system is comprised of roads leased to the Boston & Maine upon terms out of proportion to its present financial condition. For several years past it has been paying dividends without earning them. During the year ended July 1, 1914, it paid no dividends and failed to earn the amount of its fixed charges, showing a deficit of \$2,044,742.

It is obvious to any intelligent citizen that all of these losses cannot continue to fall upon the stockholders of the Boston & Maine without precipitating an undesirable disintegration of our distinctively New England transportation system. The disjoining of this railroad system would not only be harmful to the public interest of New England, but would be especially harmful to the component parts of the system itself. I know it

is claimed by some of those interested in subsidiary roads that the owners of these leased lines could take their property and successfully operate it separately. But it is not probable that this claim is either sound or ingenuous. Certainly such an attempt would be difficult if the public should decline to render any assistance to these now debilitated roads. And if by insisting upon their pound of flesh they ignore the public interest, refusing to participate in a reorganization of the railroad system in a spirit of compromise and concession, they cannot expect the assistance of the public either through increased rates, a loaning of public credit or otherwise.

I have reason to believe that many of the parties directly interested in this situation realize their responsibility and are now working out a plan of reorganization which may put this railroad system upon firmer ground. The five trustees who now control the Boston & Maine, may confidently be expected to meet the situation if they are properly supported by those most concerned in it. I conceive it to be the duty of the general court this year to help the Boston & Maine whenever and wherever the greater public interest will permit us so to do. It is peculiarly a New England institution, and the business morale and prestige of New England have been greatly harmed by its present condition. Its real interests are not different from the interests of the New England public, and recent railroad misfortunes are teaching investors that when those who manage their property propose to do anything harmful to the general public interests they are proposing something that is also harmful to the real interests of the railroad. It is to be hoped that the realization of this fact now forced upon railroad investors will tend to make the relation between the active railroad managers and the faithful public servants much easier. We all fervently hope that the five trustees who really represent the public will be able to work out the salvation of this railroad.

CAB SIGNALS IN ENGLAND

At the meeting of the Institution of Mechanical Engineers, London, December 18, papers on cab signals were read by W. C. Acfield, Midland Railway; L. P. Lewis, Caledonian; V. L. Raven, North Eastern; W. A. Stanier, Great Western, and W. Willox, Metropolitan.

Mr. Acfield treated the subject mainly from a theoretical standpoint. The Midland has fitted two engines with the system in use on the Great Western, and has had satisfactory results from this experimental use. This road has made some experiments with the "railophone," a wireless or inductive telegraph or telephone used for communicating with moving trains; but no results are given.

Mr. Lewis also discussed the subject from a theoretical point of view. Mr. Raven, who is chief mechanical engineer of the North Eastern, described his cab signal which has been in use to some extent on that road for several years. The latest form of this apparatus is now fitted to 36 locomotives. Mr. Raven's system was briefly described in the first annual report of the Block Signal and Train Control Board, November, 1908, and also in the *Railroad Gazette* of February 21, 1908. He says that "the design of the apparatus is such as to give the fullest possible indication of failure of the equipment."

The Great Western Railway signal is well known to the readers of the *Railway Age Gazette*. Mr. Stanier's paper indicates that the brake-applying apparatus is now considered a regular feature of the system. For several years it was a cab-signal only. The description has five pages of drawings. In his conclusion the author says that "the device has proved so satisfactory in service that about 180 miles and 90 engines, up to the present time, have been equipped; and its use is rapidly being extended." This cab signal has been giving satisfactory service on the Fairford Branch, 22 miles long, for about eight years.

Mr. Willox's paper described the mechanical trip train stop in use on the Metropolitan, which is similar to that in the Interborough tunnels, New York City.

General News Department

The engineers who made preliminary surveys for a government railroad in Alaska have returned and have made an informal report to President Wilson.

Senator Pomerene, of Ohio, has introduced in Congress a bill for federal regulation of railway securities, patterned after a bill on the same subject which was discussed last year, but consideration of which was abandoned. It does not appear that Mr. Pomerene expects to have his bill passed at this session of Congress.

G. D. Lankford, of Dallas, Tex., a car inspector of the Trinity & Brazos Valley, has received from the Carnegie Hero Commission a bronze medal, and \$1,000 in cash, for bravery in saving the life of Conductor L. A. Dozier in June, 1913. Dozier fell from the platform of a car to the rails and Lankford snatched him from in front of a moving train.

The South Jersey Commuters' Association has presented to the New Jersey legislature a petition, from citizens of 44 cities and towns, asking that the Public Utilities Commission be granted ample power to regulate fares to Camden, Hoboken and Jersey City. The petitioners declare that they suffer injustice in being obliged to buy season tickets to New York and Philadelphia when they desire to stop on the New Jersey side of the river, in both cases.

The Atchison, Topeka & Santa Fe has put in the field ten engineering parties to make a complete survey of one million acres of land which the road owns in the state of Arizona. This land is situated along the main line of the railroad, lying in alternate sections of 640 acres each. One purpose of the survey is that application for patenting the lands may be made. It is reported that steps will be taken for the agricultural development of parts of the land.

The House Committee on Interstate and Foreign Commerce has reported to the lower House of Congress the Stevens bill for the regulation of matters of safety on railroads. This bill was introduced on May 27 last and was noticed in the *Railway Age Gazette* of June 12, page 1343. The report of the committee is a pamphlet of eleven pages giving a summary of the arguments for the general introduction of the block system; for the use of automatic train stops as an additional safeguard for passenger trains, and for the use of steel cars and high power headlights.

At Altoona, Pa., petitions have been circulated asking the legislature of Pennsylvania to repeal the full crew law of that state. It is said that 90 per cent of the employees of the Pennsylvania Railroad in the shops at Altoona have signed the petition and have done so freely; but those who do not sign are making loud complaint. The language of the petition is the same as that in the letter of President Rea of the Pennsylvania road, in his recent appeal to the citizens of the state to abolish this oppressive law. At Harrisburg, Pa., the leaders of the brotherhood have announced that they are going to oppose the repeal of the full crew law.

The New York State Public Service Commission, First district, following its investigation of a collision on one of the elevated lines in Manhattan in December, and of the suffocation of passengers in the subway last week, has ordered the Interborough Rapid Transit Company to take measures to have only steel cars in the subway from December 1 next. At present there are between 400 and 500 cars used in the subway which have wooden bodies with metal sheathing. In the discussion between the commission and the officers of the Interborough there has been a proposal to use these wooden cars on the elevated lines; but there are some obstacles to this plan and the matter seems to be still unsettled.

Senator LaFollette on Monday of this week introduced in Congress a resolution aiming to nullify the action of the Interstate Commerce Commission in its recent order allowing a general

increase of 5 per cent in freight rates. The resolution declares that the commission did not make sufficiently thorough inquiry, and that the increase was made without good reasons. It appears to be the general opinion in Washington that the resolution will not be adopted; but that its discussion will probably bring out questions as to the fitness of Interstate Commerce Commissioner Hall, whose nomination for another term is now pending before the Senate. This nomination has been reported favorably, but Senators La Follette, Cummins and Clapp had voted against it in committee.

The Alfalfa Route

The Alabama, Tennessee & Northern, known as the "Alfalfa Route," has made a trackage agreement with the Southern Railway by which trains will be run over the Southern tracks into Mobile, Ala., beginning February 1.

The main line of the Alabama, Tennessee & Northern extends from Reform, about 80 miles west of Birmingham, southward 185 miles to Calvert, on Mobile bay. At this point connection is made with the Southern Railway. In Mobile the A. T. & N. has its own terminal grounds, owning extensive water-front property on both sides of the bay. Terminal tracks aggregating about 7 miles in length have been built to connect with other railroads and with industrial sections.

Better Inspection of Freight Trains

Following the suggestion of one of its employees, C. F. Rudolph, telegraph operator at Stafford, N. Y., the Lehigh Valley has issued the following order:

"When freight trains are pulling out of sidings, or away from inspection points, or water stations where a stop has been made to take water, the engineer will move the train not to exceed six or eight miles an hour to permit a member of the crew to make a running inspection of the entire train.

"At such points, one or more members of the train crew must be at the head end of the train before it starts and inspect the train as it passes, watching closely for bent axles, broken flanges, brake riggings down, defective brake riggings, defective arch bars, defective drawheads, wheels sliding, brakes sticking, loose wheels, hand brakes applied, car doors loose, or any other defects that can be detected."

Prosecutions Under Cattle Laws

The Department of Agriculture reports the following convictions for violation of the 28-hour live stock law during the month of November: Baltimore & Ohio Southwestern, fines and costs, \$200; Cleveland, Cincinnati, Chicago & St. Louis, \$975; Pittsburgh, Cincinnati, Chicago & St. Louis, \$100; Chicago & North Western, \$200; Pennsylvania, \$125; Philadelphia, Baltimore & Washington, \$1,800; Cincinnati, Lebanon & Northern, \$100; Baltimore & Ohio (21 cases), \$4,250; Chesapeake & Ohio, \$100; Chicago, Milwaukee & St. Paul, \$150; Chicago, Burlington & Quincy, \$100; total (48 cases), \$8,100.

Under the quarantine law the following fines were reported during the month of November, most of the convictions involving additional payments for costs: A. D. and John Clemant, \$200; Galveston, Harrisburg & San Antonio Railway, \$300; Houston & Texas Central, \$100; Louisville & Nashville, \$100; Chicago, Rock Island & Pacific, \$100; Mobile & Ohio, \$200; San Antonio & Aransas Pass, \$100; Vicksburg, Shreveport & Pacific, \$200; total (12 cases), \$1,300. All of these 12 convictions were for interstate shipment of cattle infested with Texas-fever ticks.

Block Signal Mileage

The statement of mileage of road block signaled, as of January 1, 1915, as made up for the Southern Railway, did not reach us in time to be used in the table published January 1, page 29.

The figures, showing a large increase in the mileage of road equipped with automatic signals, are as follows:

	Single track	Double track	Total
Automatic	6.3	286.8	293.1
Manual	1,803.1	156.0	1,959.1
Total	1,809.4	442.8	2,252.2

Forty-one miles, automatic, double track, represents a line used jointly with the Atlantic Coast Line; and 154 miles of manual—114 single track and 40 double track—also is to be classed in the same way; a total of 195 miles of road used jointly with the Atlantic Coast Line. The total mileage of road operated for passenger traffic by the Southern is 6,929 miles. The plans of the Southern for the current year include 142 miles of road to be equipped with automatic block signals.

On the Chicago, Milwaukee & St. Paul, the mileage of road block signaled, double track, manual, should be 145 miles, instead of 245, as given in the annual statement.

American Society of Mechanical Engineers

The Chicago Section of the American Society of Mechanical Engineers held a "railroad night" at the La Salle hotel, Chicago, on January 8, 1915, papers being presented on Locomotive Superheaters and Locomotive Stokers by R. M. Ostermann, Locomotive Superheater Company, and Clement F. Street, Locomotive Stoker Company, respectively. Mr. Ostermann gave an illustrated description of the locomotive superheater and quoted from tests showing how the steaming capacity of a locomotive boiler may be increased by the use of the superheater. As a rough average a coal saving of 25 per cent and a water saving of 35 per cent can be obtained from a superheater engine as compared with a saturated engine of the same class. He stated that there were 32,000 locomotives equipped with the top-header type superheater, of which there are nearly 12,000 in use on this continent.

Mr. Street clearly showed the importance of the locomotive to the earnings of a railroad and how by the use of the stoker on large engines their capacity may be increased 10 per cent. He also briefly described the different types of stokers in general use on American railways, and stated that there were nearly 1,000 locomotive stokers in use today. These two papers were discussed by R. Quayle and H. T. Bentley of the Chicago & North Western.

Willard A. Smith of the Railway Review gave a talk on Railway Economics, in which he questioned the policy of some of the railways in adopting the modern heavy rolling stock before their traffic demanded such equipment. He stated that the general adoption of this policy has led to an increase in maintenance of equipment costs which has become a serious burden to the railways of this country. He attributed the increase in operating ratios mainly to this cause. As another reason for increased maintenance costs he mentioned the lack of proper shop facilities, stating that in many cases equipment was purchased by roads that did not have the proper facilities for maintaining it. He believed there is a more fruitful field in developing the efficiency of the locomotive than its size. He also advocated a bureau of railway engineering, which could be created by the government, private institutions or the railways themselves, for the purpose of studying scientifically and experimentally railway problems that are now being threshed out individually by the railways with necessarily an economic loss.

American Society of Engineering Contractors

The annual meeting of the American Society of Engineering Contractors will be held in the United Engineering Societies Building, 25 West Thirty-ninth street, New York, on January 15, 1915. The annual reports of the officers will be presented and a number of important questions will be brought before the society for consideration. The annual banquet will be held in the evening. Mr. Roland, of the metallurgical department of the National Tube Company, will present an illustrated lecture on the manufacture of "National Pipe."

American Association of Railroad Superintendents

At a recent meeting of the executive committee of the American Association of Railroad Superintendents it was decided to

postpone the 1915 convention of the association to be held in San Francisco, Cal., from May 20 and 21, the date previously arranged, until August 19 and 20. Saturday, August 21, will be American Association of Railroad Superintendents' day at the Panama-Pacific International Exposition.

MEETINGS AND CONVENTIONS

The following list gives the names of secretaries, dates of next or regular meetings, and places of meeting of those associations which will meet during the next three months. Hereafter the full list of meetings and conventions will be published only in the first issue of the Railway Age Gazette for each month.

- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Weimlinger, 11 Broadway, New York. Regular meetings, 1st Thursday in month, at 2 P. M., 11 Broadway, New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.
- RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Next meeting, March 15, 1915, Chicago.
- RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwick, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.
- TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.
- TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEWARK.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, Newark.
- TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month except June, July and August, Waldorf-Astoria, New York.
- TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.
- TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.
- TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.
- WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.
- WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1914

Average mileage operated during period.

Name of road.

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net operating revenue (or deficit).	Railway tax accruals.	Operating (or loss).	Increase (or decrease) last year.
		Freight.	Passenger.	Total.	Way and structures.	Maintenance of equipment.	Traffic.				
Atlantic City	171	\$60,843	\$59,305	\$120,148	\$58,403	\$24,226	\$1,297	\$756	\$13,500	\$48,992	\$16,850
Birmingham & Gulf	27	75,681	3,106	78,787	6,642	8,496	869	13,895	11,892	45,524	52,881
Central of New Jersey	678	1,762,989	408,744	2,171,733	160,863	50,318	29,180	802,294	117,083	698,042	77,779
Chicago Great Western	411	215,675	64,708	280,383	30,863	221,351	7,951	149,020	17,725	1,475,206	1,475,206
Colorado & Southern	1,429	814,556	243,170	1,057,726	141,323	46,872	20,552	200,206	37,998	891,381	266,530
Delaware, Lackawanna & Western	618	322,087	128,418	450,505	141,323	46,872	20,552	200,206	37,998	891,381	266,530
Denver & Rio Grande	1,092	610,127	96,405	706,532	141,323	46,872	20,552	200,206	37,998	891,381	266,530
Duluth & Salt Lake	255	142,062	339,735	481,800	141,323	46,872	20,552	200,206	37,998	891,381	266,530
Detroit, Toledo & Ironton	441	157,664	12,986	170,650	141,323	46,872	20,552	200,206	37,998	891,381	266,530
Galveston, Harrisburg & Pacific	185	636,335	18,789	655,124	141,323	46,872	20,552	200,206	37,998	891,381	266,530
Georgia, Southern & San Antonio	1,346	108,030	33,236	141,266	141,323	46,872	20,552	200,206	37,998	891,381	266,530
Great Northern	8,043	4,455,738	1,065,762	5,521,500	483,123	563,742	89,824	1,545,109	21,938	5,299,561	5,299,561
Houston, East & West Texas	191	77,724	22,390	100,114	26,386	30,993	3,945	117,813	5,921	127,734	127,734
Houston & Texas Central	403	109,860	124,892	234,752	140,521	199,506	2,686	35,686	5,606	184,742	184,742
Indianapolis & St. Louis	1,647	668,117	143,698	811,815	103,406	54,776	2,006	27,208	1,462	835,044	835,044
Missouri & North Arkansas	365	71,375	27,945	99,320	29,297	37,277	6,270	72,003	8,598	152,104	152,104
Missouri, Oklahoma & Gulf Ry. of Texas	19	10,587	228	10,815	1,352	24,211	4,307	51,533	114,421	2,833,670	2,833,670
New York Central & Hudson River	3,692	5,396,784	2,347,157	7,743,941	1,079,731	1,745,680	153,707	3,293,312	17,299	890,024	890,024
Northwestern Pacific	401	109,860	124,892	234,752	140,521	199,506	2,686	35,686	5,606	184,742	184,742
Philadelphia & Reading	294	158,374	9,293	167,667	26,154	37,277	6,270	72,003	8,598	152,104	152,104
Port Reading	21	107,611	.....	107,611	10,038	3,892	40,293	.....	.....	.....	.....
St. Joseph & Grand Island	258	87,122	22,782	109,904	18,428	20,875	4,947	45,601	3,114	94,563	94,563
St. Louis Southwestern of Texas	943	491,266	98,576	589,842	75,550	106,664	28,389	175,905	809	413,867	413,867
Southern Pacific	811	243,135	75,763	318,898	81,196	87,558	13,770	159,533	3,114	94,563	94,563
Spokane International	281	63,193	26,616	89,809	20,244	7,659	1,606	42,655	13,745	2,486,762	2,486,762
Texas & New Orleans	6,522	4,595,305	2,093,532	6,688,837	784,286	991,716	163,397	2,486,762	13,745	2,486,762	2,486,762
Toledo, St. Louis & Western	163	35,655	12,091	47,746	11,685	4,383	2,232	20,614	3,170	89,273	89,273
Trinity & Brazos Valley	556	225,587	98,038	323,625	39,859	35,821	7,082	87,736	4,107	13,884	13,884
Virginia & Western	451	302,122	79,343	381,465	32,484	65,720	15,491	154,843	.....	.....	.....
Washington & Southwestern	315	80,536	13,251	93,787	20,427	12,587	2,488	41,604	.....	.....	.....
Western Pacific	2,519	1,618,951	484,506	2,103,457	278,967	447,603	89,204	992,743	9,832	1,882,965	1,882,965

FIVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915

Alabama & Vicksburg	143	\$405,456	\$191,167	\$596,623	\$107,096	\$167,548	\$18,249	\$243,825	\$15,973	\$27,619	\$580,310	\$78,862
Alabama Great Southern	309	1,396,881	490,015	1,886,896	239,735	541,328	69,117	701,489	16,485	48,899	1,617,033	444,440
Arizona Eastern	367	716,548	261,105	977,653	123,310	143,421	25,499	391,944	2,402	39,057	722,639	322,639
Atchison, Topeka & Santa Fe	8,514	28,976,691	10,082,571	39,059,262	6,202,832	7,098,678	825,783	11,489,485	4,587	763,440	26,359,002	16,121,279
Atlanta, Birmingham & Atlantic	646	782,137	253,690	1,035,827	175,642	219,331	64,825	490,588	.....	50,031	1,000,416	131,101
Atlantic City	93	249,377	193,538	442,915	121,097	121,097	26,568	158,190	7,484	22,323	488,503	88,680
Atlantic Coast Line	170	356,075	164,075	520,150	121,301	85,484	20,226	256,160	.....	14,745	488,503	88,680
Baltimore & Ohio System	4,697	7,845,063	3,141,122	10,986,185	1,933,646	2,070,387	2,422,101	283,479	4,324	387,129	9,808,767	353,861
Baltimore & Ohio Chicago Terminal	4,516	30,631,466	6,845,963	37,477,429	4,273,732	7,648,155	802,557	15,392,810	240,109	901,651	29,258,805	11,205,555
Belt Ry. Co. of Chicago	79	31,362	1,434,710	1,466,072	251,987	242,477	4,476	287,875	13,136	23,106	512,422	197,834
Bessemer & Lake Erie	631	1,037,345	1,392,647	2,430,000	88,275	118,500	4,484	446,209	6,331	47,771	1,008,928	425,781
Birmingham & Gulf	24	4,641,834	202,088	4,843,922	345,706	536,245	51,793	954,724	10,101	56,172	2,240,196	2,676,913
Boston & Maine	27	490,360	20,027	510,387	54,819	70,453	4,581	90,941	.....	9,400	230,609	283,063
Buffalo & Susquehanna R. R. Corporation	44	210,205	5,487	215,692	38,167	96,240	2,260	141,868	.....	17,385	324,900	58,268
Buffalo & Susquehanna Railway	2,402	11,681,771	7,503,962	19,185,733	3,199,968	196,218	8,673,110	90,358	188	466,248	16,065,000	4,949,459
Carolina, Clinchfield & Ohio	253	586,480	36,385	622,865	638,454	124,898	185,839	5,742	26,265	12,805	532,229	106,225
Central of Georgia	586	3,636,075	529,967	4,166,042	432,018	627,396	1,025,050	57,301	6,744	87,934	3,148,091	1,177,927
Central of New Jersey	18	823,533	86,686	910,219	93,261	84,461	34,113	177,482	.....	44,108	449,731	483,530
Central New England	1,924	3,309,217	1,403,228	4,712,445	54,813	54,813	8,893	10,681	6,424	170,064	3,939,835	1,291,224
Central Vermont	304	1,131,119	215,699	1,346,818	1,138,075	214,728	175,516	1,638,195	245,293	25,293	798,581	240,485
Chesapeake & Western	341	556,067	433,249	989,316	156,263	178,330	40,110	749,508	6,757	245,293	798,581	240,485
Chicago & Eastern Illinois	1,033	4,064,266	1,810,080	5,874,346	2,015,527	3,603,022	277,268	5,315,618	14,153	32,198	1,194,790	395,513
Chicago & Erie	1,282	4,610,342	1,254,869	5,865,211	1,346,296	1,834,832	183,617	2,149,594	51,413	147,790	4,646,427	1,733,547
Chicago & North Western	270	1,955,347	2,736,771	4,692,118	1,346,296	1,834,832	183,617	2,149,594	51,413	147,790	4,646,427	1,733,547
Chicago & St. Paul	8,108	23,519,354	9,775,349	33,294,703	5,783,034	560,772	12,636,816	269,555	717,818	25,510,141	11,514,739	1,875,000

Operating (or loss).

Operating (or loss).

Operating (or loss).

Operating (or loss).

Operating (or loss).

Operating (or loss).

Operating (or loss).

Operating (or loss).

REVENUES AND EXPENSES OF RAILWAYS

FIVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915—CONTINUED

Name of road.	Average mileage operated during period.			Operating revenues			Operating expenses			General.	Total.	Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or deficit).	Increase (or decrease) comp. with last year.
	Freight.	Passenger.	Total.	Way and structures.	Maintenance of equipment.	Traffic.	Trans- portation.	Miscellaneous.	Operating expenses.						
Chicago, Burlington & Quincy.	9,377	\$28,852,850	\$9,681,476	\$42,065,035	\$6,768,299	\$676,615	\$12,456,899	\$335,004	\$676,615	\$861,227	\$25,738,360	\$16,326,704	\$1,637,531	\$14,689,173	\$170,134
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	280,816	426,817	426,817	426,817	426,817	426,817	426,817	426,817	7,069	4,519,686	1,683,575	243,350	61,204	17,629
Chicago, Great Western.	1,428	4,257,001	1,429,744	6,203,261	59,484	238,062	2,123,309	33,866	238,062	178,526	4,519,686	1,683,575	243,350	61,204	17,629
Chicago, Indiana & Southern.	359	1,594,072	1,408,850	1,798,732	44,858	36,351	595,850	8,332	36,351	85,996	2,146,989	786,393	133,350	302,446	53,941
Chicago, Indianapolis & Louisville.	618	1,921,857	2,933,383	347,729	566,170	105,022	1,041,282	738	105,022	22,990	657,772	166,016	133,350	147,292	146,521
Chicago, Milwaukee & St. Paul.	10,067	28,737,081	8,613,045	823,788	111,640	5,047	429,919	331,323	5,047	731,645	27,392,288	14,115,517	2,035,224	134,942	110,874
Chicago, Rock Island & Gulf.	255	450,383	108,585	593,064	99,234	5,713,698	15,426,514	331,323	5,713,698	12,027	39,483,957	11,110,882	22,800	12,065,216	39,350
Chicago, St. Paul, Minneapolis & Pacific.	7,852	20,741,489	263,696	593,064	99,234	5,713,698	15,426,514	331,323	5,713,698	67,837	948,322	351,644	39,080	88,308	115,792
Cincinnati, Terre Haute & Pacific.	1,753	5,109,208	8,414,919	31,096,967	164,634	193,192	437,045	9,013	193,192	180,402	5,329,199	2,793,085	53,514	2,338,259	59,895
Cincinnati, Hamilton & Dayton.	374	3,849,925	79,216	968,235	151,022	145,185	2,824,983	78,659	145,185	82,314	741,516	226,708	53,514	195,508	169,208
Cincinnati, New Orleans & Dayton.	1,015	3,338,401	742,810	4,008,447	429,806	103,300	1,914,025	4,375	103,300	16,900	4,800,993	934,212	195,508	776,049	192,010
Cleveland, Cincinnati, Chicago & St. Louis.	337	3,042,319	742,810	4,008,447	429,806	103,300	1,914,025	4,375	103,300	303,012	11,425,197	4,455,476	644,500	3,802,880	49,659
Colorado & Southern.	246	382,642	106,247	719,136	102,398	125,907	1,239,639	6,425	125,907	28,602	2,478,154	1,036,318	42,650	1,048,833	232,724
Colorado Midland.	2,361	10,604,201	3,864,637	15,880,673	1,735,293	3,006,427	5,741,540	166,133	3,006,427	364,015	11,764,669	7,337,308	281,250	3,594,324	84,428
Cumlerland Valley.	1,392	2,566,100	706,379	3,514,472	476,512	410,082	5,865,943	126,980	410,082	27,784	5,220,930	286,970	45,000	3,140,452	48,538
Delaware & Hudson Co.—R. R. Dept.	338	728,334	131,072	1,308,028	151,751	189,043	5,551	1,058,255	23,930	16,900	4,800,993	934,212	195,508	776,049	192,010
Delaware, Lackawanna & Western.	881	8,095,398	1,463,309	10,112,775	723,894	1,524,526	134,918	3,502,246	3,907	30,796	991,488	178,151	16,800	160,641	75,514
Denver & Rio Grande.	2,586	7,687,367	3,879,265	19,101,978	2,285,590	2,967,236	344,874	5,741,540	166,133	364,015	11,764,669	7,337,308	281,250	3,594,324	84,428
Detroit & Mackinac.	400	300,987	184,975	10,565,875	1,568,533	1,851,684	195,056	5,741,540	166,133	297,383	6,236,654	3,876,121	281,250	3,594,324	84,428
Detroit, Grand Haven & Milwaukee.	79	598,061	809,900	489,839	97,401	135,099	12,861	252,873	154,842	267,982	6,974,669	3,500,970	450,000	6,411,861	48,538
Duluth & Iron Range.	441	699,000	300,000	1,169,639	200,440	168,385	36,200	557,388	1,021	13,457	522,930	286,970	45,000	3,140,452	48,538
Duluth, Mississippi & Northern.	292	2,470,886	97,529	2,663,013	124,620	118,321	19,396	497,180	5,080	13,457	522,930	286,970	45,000	3,140,452	48,538
Duluth, South Shore & Atlantic.	364	2,918,238	149,260	3,134,476	349,843	355,305	10,513	530,398	15,782	23,412	788,928	178,151	16,800	160,641	75,514
El Paso & Southwestern Co.	185	433,988	98,641	527,313	120,934	103,864	12,888	199,909	5,058	30,145	472,497	74,816	27,366	47,450	122,928
Elgin, Joliet & Eastern.	1,027	2,391,262	521,401	3,167,605	393,877	449,173	90,039	843,805	28,567	113,991	1,907,268	1,260,337	176,053	1,089,075	86,940
Florida East Coast.	778	3,518,804	4,250,985	24,229,084	2,789,933	688,176	28,046	1,059,683	165,311	494,529	17,642,168	6,866,916	164,165	1,334,294	86,940
Galveston, Harrisburg & San Antonio.	696	410,322	89,543	2,429,084	368,033	5,446,230	459,444	8,447,134	165,311	21,311	289,573	219,691	758,300	581,143	44,496
Georgia, Southern & Florida.	454	883,673	555,304	1,663,323	302,424	258,872	10,512	151,852	165,311	21,311	289,573	219,691	758,300	581,143	44,496
Grand Rapids & Indiana.	1,446	1,538,904	718,448	2,383,513	222,564	326,821	31,837	39,976	607,746	91,814	1,290,858	372,465	98,000	274,420	252,404
Grand Trunk Western.	307	826,833	342,124	1,268,100	150,696	233,011	60,044	545,676	658	39,120	4,005,790	1,260,654	30,000	96,654	270,549
Great Northern.	375	1,294,031	948,339	2,453,400	264,237	364,633	56,704	387,205	23	50,179	1,049,204	178,896	19,423	889,910	159,703
Gulf & Ship Island.	8,043	25,022,000	884,000	3,119,885	530,276	3,339,184	3,339,184	3,339,184	3,339,184	70,160	1,736,422	716,979	121,252	595,727	90,303
Hocking Valley.	308	5,296,440	1,445,331	7,093,752	906,514	1,003,034	136,255	2,389,822	1,266	170,721	4,606,317	2,489,435	36,393	2,433,628	243,628
Houston & Texas Central.	351	2,091,019	401,799	3,124,859	402,865	582,056	41,989	940,748	8,472	87,012	2,037,819	1,087,041	194,000	893,041	194,000
Houston, East & West Texas.	857	2,071,038	715,864	2,986,655	527,622	400,647	75,355	1,150,408	15,314	63,628	20,872,314	6,496,049	19,348	84,857	50,134
Illinois Central.	191	391,835	147,616	2,570,591	117,622	80,116	9,653	235,266	152,311	63,628	20,872,314	6,496,049	19,348	84,857	50,134
Indiana Harbor Belt.	4,769	19,454,810	5,843,634	27,368,362	4,018,367	6,120,727	517,343	9,575,419	152,311	63,628	20,872,314	6,496,049	19,348	84,857	50,134
International & Great Northern.	105	2,852,368	881,378	1,447,077	196,387	6,120,727	517,343	9,575,419	152,311	63,628	20,872,314	6,496,049	19,348	84,857	50,134
Kanawha & Michigan.	1,160	1,854,987	2,006,345	1,831,969	154,450	1,738,615	1,738,615	1,738,615	1,738,615	70,160	1,736,422	716,979	121,252	595,727	90,303
Lake Erie & Western.	827	3,384,939	160,453	1,380,568	193,361	314,613	12,466	150,284	1,266	170,721	4,606,317	2,489,435	36,393	2,433,628	243,628
Lehigh & Hudson River.	906	2,033,423	672,156	4,449,165	500,374	537,363	364,501	414,912	61,278	33,961	3,334,142	681,349	145,000	536,051	840,012
Lehigh Valley.	1,219	13,885,741	5,673,544	22,496,636	2,406,297	4,474,973	416,451	7,500,578	259,748	59,726	1,867,310	1,610,252	237,109	1,371,801	58,864
Long Island.	97	706,659	51,454	769,249	118,391	98,856	6,541	274,248	14,914	26,302	631,059	188,975	39,500	149,475	40,604
Louisiana & Arkansas.	1,444	15,858,987	2,006,345	1,831,969	154,450	1,738,615	1,738,615	1,738,615	1,738,615	70,160	1,736,422	716,979	121,252	595,727	90,303
Louisiana Ry. & Navigation.	398	587,914	102,122	710,169	611,477	583,516	7,777	2,435,500	35,660	21,835	483,046	225,723	20,750	232,516	95,458
Louisville & Nashville.	351	554,388	113,449	820,035	167,678	87,065	6,541	274,248	14,914	26,302	631,059	188,975	39,500	149,475	40,604
Maine Central.	208	589,269	290,848	938,090	99,191	176,548	33,313	785,147	14,914	26,302	631,059	188,975	39,500	149,475	40,604
Michigan Central.	5,034	16,218,137	4,941,618	22,740,356	3,628,257	4,687,020	26,646	7,500,578	259,748	59,726	1,867,310	1,610,252	237,109	1,371,801	58,864
Midland Valley.	1,219	2,909,501	1,749,955	5,113,389	729,072	786,024	61,511	1,843,021	33,404	32,434	17,187,745	5,516,613	47,479	249,076	35,447
Minneapolis & St. Louis.	1,800	8,744,706	4,083,935	14,546,000	1,569,439	3,270,397	327,034	5,728,960	250,835	130,877	3,543,987	1,569,402	255,964	1,437,707	1,621,798
Missouri & North Arkansas.	380	4,122,749	188,999	639,622	4,444,122	129,475	117,311	10,400	1,599,512	28,105	4,900,649	1,48,973	32,910	115,734	900,213
Missouri, Kansas & Texas System.	1,646	3,293,715	902,703	1,436,801	1,668,476	1,816,202	37,866	3,966,178	78,906	251,449	2,980,788	1,463,334	196,992	1,266,341	123,626
Missouri, Oklahoma & Gulf.	365	9,331,781	2,930,076	13,436,801	1,548,199	1,463,316	107,368	23,212	255,565	29,383	5,456,576	576,015	4,880,561	51,015	13,626
Missouri Pacific.	3,865	9,462,562	3,794,655	14,271,148	1,878,001	2,119,950	284,615	4,938,148	136,422	448,609	9,717,366	4,553,282	40,078	5,164,084	110,515
St. Louis & Texas.	334	387,076	105,740	518,380	107,056	8,778	1,075	219,507	512	2,539	457,859	60,521	32,354	399,397	27,813
St. Louis & Texas.	392	2,067,733	131,176,096	1,657,557	2,401,292	320,668	4,716,852	40,239	316,069	9,452,678	3,723,418	492,950	3,225,896	1,158,855	2,931

10,968

269,555

717,818

25,510,141

11,514,799

1,875,000

9,637,930

—924,642

1,367,312

656,023

847,466

400,269

1,367,312

656,023

REVENUES AND EXPENSES OF RAILWAYS

FIVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915—CONTINUED

Name of road.

Average mileage operated during period.

	Operating revenues				Operating expenses				Net operating revenue (or deficit)	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
	Freight.	Passenger.	Total, inc. misc.	Maintenance of way and structures, equipment.	Traffic.	Trans- portation.	Miscel- laneous.	General.				
Mobile & Ohio	1,122	\$3,899,974	\$584,727	\$4,762,014	\$208,302	\$1,848,534	\$13,757	\$148,393	\$3,692,264	\$153,926	\$915,418	—\$282,866
Monongahela	75	421,451	11,076	441,654	36,842	1,020,224	12,945	59,330	1,492,086	457,740	184,988	—\$21,116
Nashville, Chattanooga & St. Louis	1,231	3,255,830	1,164,921	4,820,495	363,356	2,338,855	45,841	147,723	3,924,210	98,879	357,576	—\$21,261
Nevada Northern	165	391,655	47,575	468,660	87,040	68,897	11,431	19,333	290,242	162,242	129,953	—\$91,061
New Orleans & North Eastern	204	1,102,611	234,895	1,468,330	163,734	324,118	2,247	59,139	1,441,752	326,378	253,178	—\$19,586
New Orleans, Mobile & Chicago	283	594,525	134,002	689,711	187,784	102,047	863	32,519	457,740	153,568	8,580	—\$282,866
New York Central & Hudson River	403	593,581	138,255	774,538	147,906	114,030	318	147,723	1,492,086	457,740	184,988	—\$21,116
New York, Chicago & St. Louis	286	593,581	138,255	774,538	147,906	114,030	318	147,723	1,492,086	457,740	184,988	—\$21,116
New York, New Haven & Hartford	3,692	27,031,668	670,710	4,771,956	649,990	882,232	769,998	16,689,648	899,446	1,091,859	34,094,890	162,347
New York, Ontario & Western	2,003	12,926,752	12,165,826	28,080,222	3,655,661	4,112,376	180,964	10,396,264	234,344	648,319	19,226,408	8,853,813
New York, Philadelphia & Norfolk	568	2,750,550	933,843	4,266,533	599,645	731,048	21,435	703,451	23,421	27,205	2,978,870	1,287,662
Norfolk Southern	112	1,302,852	333,240	1,682,189	165,623	320,419	1,435,544	10,386	540,530	295,837	5,363,388	49,157
Norfolk & Western	140	879,804	233,431	1,237,404	137,372	143,544	10,386	540,530	295,837	5,363,388	49,157	49,157
Northern Pacific	2,044	15,547,082	2,171,080	18,424,958	2,725,266	3,593,621	295,837	5,363,388	49,157	31,461	12,114,822	6,310,136
Oregon Short Line	6,458	1,009,810	496,401	1,634,625	231,750	265,118	361	99,836	1,230,967	403,638	58,525	—\$24,469
Panhandle & Santa Fe	401	21,718	904,116	1,819,440	4,163,601	145,409	2,259,867	143,140	280,917	4,461,282	2,902,224	477,582
Pennsylvania	2,162	6,783,680	2,109,893	9,652,072	1,435,729	1,176,918	37,877	596,025	441,669	450,861	1,230,967	403,638
Pere Marquette	668	1,330,719	287,189	1,698,341	305,245	328,230	145,409	2,259,867	143,140	280,917	4,461,282	2,902,224
Philadelphia & Reading	4,519	17,996,295	4,390,290	24,885,403	3,656,343	4,336,231	18,685	5,217,358	67,584	278,651	5,367,178	4,284,894
Philadelphia, Baltimore & Washington	1,120	5,147,041	1,940,655	7,929,000	731,697	1,492,160	156,084	2,873,354	189,924	43,399	1,232,294	475,047
Pittsburgh & Lake Erie	717	4,460,150	3,006,776	8,954,680	1,330,974	1,589,533	127,412	6,946,491	54,816	342,416	13,251,438	6,846,988
Pittsburgh, Cincinnati, Chic. & St. Louis	224	5,630,153	761,776	6,667,027	886,946	1,270,611	17,336	13,557	4,266,013	2,401,431	285,756	6,846,988
Port Reading	1,472	11,567,414	3,593,048	17,162,266	2,259,548	3,218,905	329,587	6,080,590	126,021	17,336	13,557	4,266,013
Richmond, Fredericksburg & Potomac	294	719,195	57,114	786,954	192,234	229,123	7,704	255,705	196,259	429,684	600,841	20,765
St. Joseph & Grand Island	88	513,133	370,150	1,121,028	86,630	45,899	195	196,259	429,684	600,841	20,765	20,765
St. Louis & San Francisco	468	566,262	370,150	1,121,028	86,630	45,899	195	196,259	429,684	600,841	20,765	20,765
St. Louis, Brownsville & Mexico	258	387,789	179,555	567,344	107,920	236,359	273,427	4,118,285	52,676	29,913	730,231	260,196
St. Louis, Iron Mountain & Southern	4,746	12,077,809	4,750,962	17,975,712	2,522,548	2,784,055	324,484	5,925,300	17,708	35,350	753,993	390,454
St. Louis Merchants' Bridge Terminal	3,365	574,264	329,334	900,427	183,847	104,688	26,108	370,825	273,427	4,118,285	52,676	29,913
St. Louis Southwestern	9	8,867,263	2,426,462	13,311,419	1,889,560	2,356,783	273,427	4,118,285	52,676	29,913	730,231	260,196
St. Louis Southwestern of Texas	235	388,707	147,343	535,855	310,670	371,302	130,295	836,081	17,708	35,350	753,993	390,454
San Antonio & Aransas Pass	811	1,063,831	450,037	1,643,558	399,422	413,115	60,622	1,310,650	17,708	35,350	753,993	390,454
Seaboard	724	1,195,962	532,563	1,842,791	316,881	338,293	33,531	1,242,216	187,031	317,373	66,935	57,628
Southern	1,132	2,533,161	1,061,686	3,594,901	440,728	633,722	159,899	1,324,104	329,129	3,171,982	34,234	267,234
Southern in Mississippi	3,101	5,720,083	1,893,756	8,255,040	1,050,481	1,324,104	953,727	10,027,463	12,137	207,493	13,302,774	694,805
Spokane International	7,036	17,496,681	7,612,056	27,481,328	3,806,014	4,921,366	12,137	207,493	13,302,774	694,805	1,161,758	26,027,906
Tennessee	281	272,538	152,040	464,345	114,674	46,034	4,532	387,539	38,119	663,313	71,060	63,126
Tennessee Central	163	263,568	78,388	365,307	64,324	125,105	11,505	111,151	462,083	18,195	67,594	17,594
Terminal R. R. Ass'n of St. Louis	556	1,281,287	709,508	2,188,653	244,819	177,384	40,505	253,893	18,195	67,594	17,594	17,594
Texas & New Orleans	294	434,263	179,877	655,884	154,309	177,384	40,505	253,893	18,195	67,594	17,594	17,594
Toledo & Peoria	35	1,068,004	476,138	1,544,142	101,011	60,351	4,532	387,539	38,119	663,313	71,060	63,126
Toledo, St. Louis & Western	1,887	5,361,722	1,916,070	7,277,792	829,356	1,087,786	140,039	1,242,216	187,031	317,373	66,935	57,628
Trinity & Brazos Valley	446	2,066,331	287,785	3,144,116	414,556	512,467	38,119	663,313	71,060	63,126	140,039	1,242,216
Union Pacific	248	305,243	204,720	510,000	86,380	136,944	14,886	224,303	9,009	49,564	1,725,464	786,836
Union R. R. of Baltimore	315	1,652,812	157,135	1,947,508	255,175	303,786	80,761	724,197	5,765,057	374,685	589,114	1,407,431
Union R. R. of Pennsylvania	3,615	17,940,245	4,560,738	24,968,800	3,184,499	50,357	17,208	5,765,057	374,685	589,114	1,407,431	1,407,431
Vandalia	31	565,327	117,859	683,218	215,008	509,756	509	509	509	509	509	509
Virginian	910	3,282,682	1,087,204	4,369,886	733,544	930,112	119,065	1,825,430	57,805	105,997	3,771,953	1,118,468
Virginian & Southwestern	171	345,846	218,072	563,918	101,011	60,351	4,532	387,539	38,119	663,313	71,060	63,126
Wabash	240	721,222	218,072	939,294	140,039	1,242,216	187,031	317,373	66,935	57,628	140,039	1,242,216
Washington Southern	503	2,185,794	773,721	2,959,515	414,556	512,467	38,119	663,313	71,060	63,126	140,039	1,242,216
West Jersey & Seashore	2,519	8,891,663	2,965,849	11,857,512	1,625,105	2,150,210	281,105	2,431,315	2,811,315	2,811,315	2,811,315	2,811,315
Western Maryland	36	181,261	185,261	370,522	49,925	64,592	2,201	2,201	2,201	2,201	2,201	2,201
Western Pacific	356	820,706	2,621,121	3,441,827	497,925	64,592	2,201	2,201	2,201	2,201	2,201	2,201
Western Ry. of Alabama	661	2,918,358	478,344	3,396,702	3,359,359	525,200	583,910	1,113,159	4,473,259	4,473,259	4,473,259	4,473,259
Wheeling & Lake Erie	943	1,976,750	566,662	2,543,412	649,187	818,869	140,039	1,242,216	187,031	317,373	66,935	57,628
Yazoo & Mississippi Valley	1,382	2,054,540	271,531	2,326,071	531,722	98,279	131,062	288,447	776,045	1,034,247	4,887,872	776,045

Traffic News

It is reported that the Canadian railways are preparing to make an application to the Board of Railway Commissioners for Canada for authority to make a general five per cent advance in freight rates east of the Great Lakes.

The Pennsylvania and the Philadelphia & Reading have begun proceedings in the County Court at Harrisburg, Pa., to contest the recent order of the Pennsylvania State Commission reducing by 40 cents a ton the freight rate on anthracite coal from the mines to Philadelphia.

Passenger officers of the Ohio railroads who appeared at meetings before commercial associations last week at Cleveland, Columbus, Youngstown and Toledo, asking support for the proposed repeal of the two-cent passenger fare law in Ohio, plan to continue their conferences with commercial associations at Ashtabula, Kingsville, Elyria, Sandusky, Norwalk, Fremont, Wauson and Bryan in northern Ohio, and a number of other cities and towns in southern Ohio.

Representatives of the railroads and the grain shippers have decided to refer to the Interstate Commerce Commission the controversy regarding the payment of demurrage charges at Galveston, Tex., on grain shipments which were held up at that port in August on account of the difficulty in getting ships to take the grain away. An amount estimated at between \$125,000 and \$150,000 in demurrage charges is in dispute. The grain men and ship agents claim that demurrage should be waived because the European war rendered it impossible to get ships promptly.

The western railways have appointed a committee of five lawyers to prepare their case for advances in interstate freight rates on a number of commodities. Hearings are to begin before Commissioner Daniels in Chicago on February 15. The committee consists of C. C. Wright, general solicitor of the Chicago & North Western; T. J. Norton, general attorney of the Atchison, Topeka & Santa Fe; W. F. Dickinson, general attorney of the Chicago, Rock Island & Pacific; C. S. Berg, commerce attorney of the Missouri, Kansas & Texas, and A. P. Humburg, commerce attorney of the Illinois Central.

Effect of Panama Canal on Rail Traffic

Railway and Marine News of Seattle, Wash., publishes an interview with a railroad man, stating that recently he saw on the side tracks at Huntington, Ore., 11 cars of Idaho wheat bound for Portland, to be sent from there by way of Panama canal to the Atlantic seaboard. This, he said, was the first shipment of Idaho wheat ever carried by the Oregon Short Line to tidewater bound for another seaport. He also mentioned that dried fruits are now moving from the Pacific coast to Atlantic ports at a rate of 26 cents per 100 lb., and canned goods at 30 cents; and large shipments of salmon from Alaska, which have gone principally by rail to Chicago and the eastern seaboard are now going by way of the canal. He also mentioned the case of a piano manufacturing concern in Chicago that has found out that it can ship in carload lots to New York and then by the canal to the Pacific coast cheaper than by rail from Chicago to the same point of destination; and that shipments of household furniture from Rockford, Ill., have moved to Pacific coast points by the same route.

The same publication reports an enormous demand for cold storage space on boats running through the canal, from the fruit and vegetable shippers along the Pacific coast. The steamer Ohioan of the American Hawaiian fleet, which sailed from San Francisco on December 23, was offered 8,000 tons of fruit and vegetables, fish and other products, which are best carried in cold storage rooms. The boat only had a capacity of 1,500 tons in its refrigerating rooms, and apples and fish had been offered at the Puget Sound ports which would fill this space. F. A. Hooper, district freight manager of the American Hawaiian Steamship Co., is quoted as saying that he has never seen anything to equal the demand for refrigerating space for the New York trade, and that it has been necessary to allot the available space to the various districts to avoid complaints of discrimination.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The Dallas (Texas) Chamber of Commerce Freight Bureau and the Fort Worth Freight Bureau have filed a joint petition with the Interstate Commerce Commission charging discrimination in the rates from St. Louis and Kansas City to Shreveport, La., as compared with the rates to Texas points.

Rating on Live Poultry in Western Trunk Line Territory

Opinion by Commissioner Meyer:

For many years live poultry in carloads has been rated second-class in the western classification, but under exception to the classification the traffic has moved in western trunk line and trans-Missouri territories under fourth-class rates. The commission finds that the carriers have justified a proposed increase from these fourth-class rates to third-class rates. Live poultry should move under a higher rate than many other similar commodities because the traffic is light and requires equipment constructed especially for its movement, which equipment cannot be used for any other traffic, so that the empty car movement is at least equal to the loaded car movement. (32 I. C. C., 380.)

Rates on Lumber from Memphis to New Orleans

Bellgrade Lumber Company et al v. Illinois Central et al. Opinion by Commissioner McChord:

The commission reaffirms its decision in Lumber Rates from Memphis to New Orleans (27 I. C. C., 471), that the carriers were justified in increasing the rates on lumber of all kinds from Memphis, Tenn., to New Orleans, La., from 10 cents to 12 cents in order that the rates on hardwood lumber and gum should be the same. It is found, however, that the present rates on hardwood lumber, other than gum, from points south of Memphis to New Orleans are unreasonable, and the carriers are ordered to maintain a rate not in excess of 11 cents from the territory north of the Southern Railway and 10 cents from the territory south of the Southern Railway to New Orleans. (32 I. C. C., 403.)

Switching Charges on Coal within the Chicago Switching District

Opinion by Commissioner Clark:

The Chicago & North Western, having proposed to cancel tariffs which grant the Chicago rates on coal and coke in carloads from mines in Ohio, Pennsylvania, Virginia and West Virginia to Greenwood street, Weber, Crawford avenue, and Peterson avenue, stations on the carrier's "Mayfair cut-off," which change would increase the charges 25 to 30 cents per ton, the commission holds that the increase is not justified. It is found, however, that the rates to Peterson avenue and Crawford avenue may reasonably exceed the rate to Chicago by not more than five cents a ton, minimum \$2 per car, and to Weber and Greenwood street station not more than ten cents a ton, minimum \$4 per car. (32 I. C. C., 444.)

Rates Between Points in Minnesota Via Interstate Routes

In re freight rates between points in Minnesota via interstate routes and between points in Minnesota and other states. Opinion by Commissioner Harlan:

The commission finds that the carriers have justified proposed increased class rates and increased commodity rates except on cement, lime and plaster between Duluth, Minn., and related points on the one hand, and St. Paul and Minneapolis, Minn., and related points on the other, except in so far as violations of the long-and-short-haul rule of the fourth section would result from such increased rates. The commission states that it is evident from the record that the proposed class rates are more nearly in line with the class rates in effect generally throughout this territory than are the present rates, and that no good reason has been suggested why the rates between Duluth and the twin cities should be lower than rates in other parts of the same territory. (32 I. C. C., 361.)

Rates on Cotton in Round Bales

American Round Bale Press Company v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Daniels:

Cotton shipped from gin points in Arkansas, Oklahoma and Texas to Houston, Tex., and the ports of Galveston and Texas City, Tex., and New Orleans, La., is usually compressed in transit, for which service the railroads pay to compress companies 10 cents per 100 lb. Upon cotton which is already compressed when offered to the carriers for transportation, and will, therefore, cost them nothing in the way of compress charges, they make a rate 10 cents per 100 lb. less than that upon cotton to be compressed in transit. The net revenue to the carriers is the same in both cases. Complainants, however, who are interested in the manufacture of machines for the compressing of cotton at the gin into bales of especially high density, and shippers of cotton so compressed, attack the existing any-quantity rates as unreasonable and discriminatory when applied to bales of high density which will load 50,000 lb. to a car, and ask that carload rates with a 50,000 lb. minimum be established.

The commission finds that the existing any-quantity rates on cotton are not unreasonable nor discriminatory, even when applied to bales of high density. It is also held that the cotton industry in the southwest is so organized that the existing any-quantity rates are best suited to its needs, and that the establishment of carload rates, though they might effect some economies in transportation cost, would tend unduly to concentrate the cotton-producing industry, especially in the light of the facts that the average product of a cotton farm of this region is not over 11 bales, and that a carload of cotton represents an investment of several thousand dollars. (32 I. C. C., 459.)

Supplementary Order in the Five Per Cent Case

The commission has entered an order in the eastern rate advance case, directing the railways to maintain their existing grouping in the eastern rates and to grade all the rates in accordance with the measure of the New York-Chicago and Montreal-Chicago rates, even though by so doing some rates are increased slightly more than five per cent.

The order states in part: "It is further ordered that in establishing the said rates approved in the said reports the rates from Chicago, to New York and Montreal, and from New York to Chicago may be increased five per cent, and those increased rates may be scaled to or from percentage points or groups upon the established percentage groupings and percentages; that the rates via ocean-and-rail and established all-rail differential lines may be made the same differentials under the standard all-rail rates as now exist; and that the established groupings or points of origin or of points of destination under common rates may be preserved; even though so doing results in increasing some rates slightly more than five per cent."

Rates on Livestock from Points in Arizona

American National Live Stock Association et al. v. Southern Pacific et al. Opinion by Commissioner Clark:

In *American National Live Stock Association v. Southern Pacific Company* (26 I. C. C., 37) the commission prescribed a schedule of distance rates on live stock in carloads from points in Arizona to points in California. It was found that the rates on stock cattle and on sheep for feeding should not exceed 85 per cent of the rates on beef cattle and fat sheep respectively, and that there might be added to these rates not to exceed \$5 per car for a two-line haul of 500 miles or less, and \$2.50 per car for a branch-line haul. The commission now finds in addition that the defendants should establish through routes and joint rates on live stock in carloads from all points in Arizona on their lines from which joint rates are not now in effect to all feeding and slaughtering points on their lines in California, whether the haul be over two lines or three lines. It is provided, however, that the Southern Pacific shall not have to join in any through route or joint rate permitting the Santa Fe to participate in the transportation of live stock from points on the Arizona Eastern or the El Paso & Southwestern to points reached by the Southern Pacific over its own rails. It is also provided that the Santa Fe shall not be required to join in through routes via Phoenix and Maricopa from points on the Santa Fe main line. The rates prescribed as to be the same as before, \$5 per car for a two-line haul and \$2.50 per car for a branch-line haul,

with that exception that the requirement that the \$5 rate apply over a two-line haul of 500 miles or less is omitted in order to avoid higher charges for 500 miles than for 525 miles over the same route in the same direction. (32 I. C. C., 438.)

Switching Charges at Baltimore

Merchants' & Manufacturers' Association et al. v. Pennsylvania Railroad et al. Opinion by Commissioner McChord:

In its original report in this case, given on May 14, 1912 (32 I. C. C., 474) the commission found that the charges for the interchange of interstate traffic in carloads in Baltimore, Md., should not exceed the flat Baltimore rate by more than five cents per 100 lb. on first and second classes, or by more than two cents on third, fourth, fifth and sixth classes. It was also found as to commodities not moving under class rates that the charges should not exceed the flat Baltimore rate by more than two cents per 100 lb. An extension of the switching limits and the fact that intrastate switching charges have been placed on a per car basis, both in accordance with decision of the Public Service Commission of Maryland, having changed the situation to some extent since the previous decision and with a view to uniformity of switching charges the commission now finds that the charge for interline switching movements in Baltimore in no case should exceed the flat Baltimore rate by more than two cents per 100 lb. as applied to commodities moving under either class or commodity rates and that any higher charge would be unreasonable. (32 I. C. C., 434.)

Rates on Grain from Kansas City to Memphis

Board of Trade of Kansas City, Mo., v. St. Louis & San Francisco et al. Opinion by Commissioner Meyer:

The commission finds that the proportional rates from Kansas City to Memphis, of 14 cents per 100 lb. on wheat and products of wheat, and 13 cents per 100 lb. on coarse grain and products are not unreasonable per se, nor discriminatory as compared with rates from Omaha to Memphis one cent per 100 lb. higher than from Kansas City, thus following the decision in *Kansas City Transportation Bureau v. Atchison, Topeka & Santa Fe* (16 I. C. C., 195) where the same rates were attacked.

The commission notes in its decision that the changes asked for would affect not merely the grain traffic from Kansas City and Omaha to Memphis and the southeast, but would also have a bearing upon the traffic from numerous competing markets to the destination territory here involved, as well as to other destinations.

It is also noted that the proportional rates are such that when the total charge from the grain fields to Memphis via Kansas City and via Omaha is considered, the former is not at an undue disadvantage. In this connection reference is made to the statement in the previous case that "A proportional rate means a part of or a remainder of the through rate, or it means nothing at all, and in a case of this kind there must be an examination and consideration of the entire rate from point of production to ultimate destination. It is not sufficient to consider the rates to an intermediate market nor alone the rates from such market, if the question of discrimination between such markets is to be determined."

With reference to the statement that there has been a decline in the shipments from Kansas City to Memphis and through Memphis to the Mississippi valley and southeast during recent years, it is noted that a large part of this change is due to the increase in corn production in the southeastern states. The commission quotes from a former decision to the effect that it is not within the power of this commission to equalize economic conditions or to place one market in a position to compete on equal terms with another market as against natural advantages. It has the power to require railroads in the face of varying trade conditions, to adjust their rate schedules in such manner as to insure to a market the continuance of a trade it has once enjoyed." (32 I. C. C., 297.)

STATE COMMISSIONS

The Railroad & Warehouse Commission of Minnesota has issued an order calling for the abolition of switching charges on extensive freight traffic at Minneapolis and at Minnesota transfer. A charge of \$1.50 a car on grain taken to elevators is the principal feature that will be changed by the order.

In connection with the application of the roads for authority to make a general increase of 5 per cent in freight rates, the Virginia commission has directed the chambers of commerce of the different cities to file, within ten days from January 7, any objections which they may have to offer. It is expected that objections will be received from Richmond, Petersburg, Norfolk and Alexandria.

The State Corporation Commission of Virginia has authorized the railroads of the state to make, in Richmond and Lynchburg, a "track storage" charge, on bulk freight, in addition to the usual demurrage charge. The track charge, in addition to the demurrage charge will be for the first two days after the expiration of the free time, one dollar a car each day; and thereafter two dollars a car each day.

The Minnesota Railroad & Warehouse Commission has ordered the Chicago, Rock Island & Pacific to limit the speed of passenger trains in Minnesota to 30 miles an hour. This order appears to have been a result of the investigation of the derailment at Northfield, on December 13, in which a passenger was killed. The commission holds that the tracks of the company are not in sufficiently good condition.

The New York State Public Service Commission, Second district, has authorized all railroads operating under its jurisdiction to make a 5 per cent advance in freight rates, on ten days' notice, to correspond with the advances which have been authorized in interstate traffic by the Interstate Commerce Commission. None of these advances affect coal, coke or iron ore. The Pennsylvania commission, to which a similar application on the part of the roads appears to have been made, decided not to permit any increase in less than the statutory thirty days' notice.

The New Orleans, Mobile & Chicago has been fined \$13,000 by the Mississippi railroad commission for discontinuing certain trains after a petition for permission to do so had been refused. After the commission's refusal W. F. Owen, receiver for the railroad, took the matter to the federal court and was granted permission to discontinue the trains both in Mississippi and Alabama. The commission, in assessing the fine says that the road failed to obtain an injunction against carrying out the commission's order before the federal court acted on the case and that it still had jurisdiction in the matter. The company was fined \$500 for each day the commission's order was violated.

The California Railroad Commission has rendered a decision holding that the Standard Oil Company, the Associated Oil Company, the Producer Transportation Company, the Associated Pipe Line Company and the General Pipe Line Company of California, are common carriers and public utilities, and subject to the public utilities act of California. The commission finds that these companies are controlled by five interests, which together control 95 per cent of the entire oil production of the state. The pipe lines are held to be public utilities in the transportation of crude oil, petroleum or the products thereof by means of pipe lines from the San Joaquin valley oil fields.

COURT NEWS

The sixth court of civil appeals at Texarkana, Tex., has rendered a decision holding that the International & Great Northern has violated its contract with the city of Palestine, Tex., in moving its general offices and shops from Palestine to Houston, after it had been given a bond issue of \$160,000 to locate at Palestine. Officers of the road say that the case will be appealed to the supreme court of the state.

In the Federal Court at Philadelphia, January 6, the grand jury returned three indictments against the Philadelphia & Reading concerning irregularities in the transportation of coal. On 51 counts the road is charged with having engaged in transportation of coal without having filed tariffs. The transportation was in part by the Philadelphia & Reading Transportation line of barges, owned by the Reading between Philadelphia and New England points. Another indictment of 50 counts charges the road with granting concessions to certain shippers by holding their coal at Woodlane yard, eight miles from the Port Richmond coal piers, when it was destined to Port Richmond, and then not charging demurrage for such detention. The third indictment of 25 counts charges failure to collect demurrage on 25 shipments from the mines to Port Richmond.

Railway Officers

Executive, Financial, Legal and Accounting

F. B. Sheldon has been appointed vice-president of the Toledo & Ohio Central and the Zanesville & Western, with headquarters at Columbus, Ohio, succeeding J. J. Bernet.

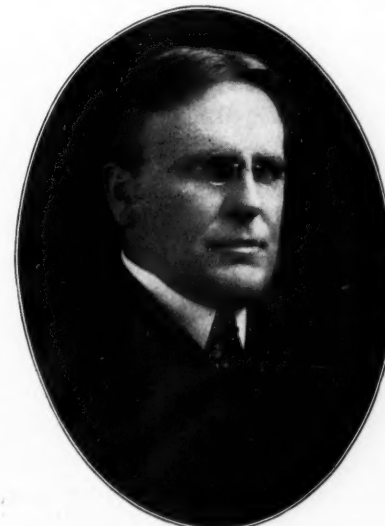
R. N. Hudson, general manager of the Louisville & Atlantic at Versailles, Ky., has been elected president, general manager and a director of the Louisville, Henderson & St. Louis, succeeding L. J. Irwin, deceased.

R. E. M. Cowie, manager of the American Express Company at Denver, Colo., has been appointed vice-president and general manager of the eastern department, with headquarters at New York, succeeding H. S. Julier, resigned. Mr. Julier, who is 73 years old, has been with the American Express Company for 56 years.

C. F. Daly, who was vice-president in charge of the traffic department of both the New York Central & Hudson River and the Lake Shore & Michigan Southern retains his same duties with the consolidated company, the New York Central Railroad, with headquarters at New York; and Albert H. Harris, who was general counsel of the New York Central Lines east of Buffalo and vice-president of the lines west of Buffalo, has been appointed vice-president of the New York Central Railroad with headquarters at New York. Mr. Harris also retains the vice-presidency of those lines west of Buffalo which are not affected by the consolidation. The other executive officers of the New York Central & Hudson River, except those recently mentioned in these columns, retain the same duties with the consolidated company.

A. W. Newton, whose appointment as assistant to the president of the Chicago, Burlington & Quincy, was announced in our issue of January 8, was engaged in general engineering practice from 1892 to 1900,

and entered the service of the Chicago & Alton in 1900 as assistant engineer, with headquarters at Kansas City, Mo. He was transferred to Bloomington, Ill., in 1902, and in March of the following year he went to the Chicago, Burlington & Quincy as engineer of construction on lines in the Missouri district. In 1904 he was transferred to the Illinois district as assistant engineer, returning to the Missouri district as district engineer in December of that year. In 1907 Mr. Newton was appointed general inspector of permanent way and structures on the staff



A. W. Newton

of the vice-president at Chicago. On January 1, 1914, he was appointed chairman of the committee on Federal Valuation, and in connection with these duties was appointed on the Engineering Committee of the Presidents' Conference Committee on Valuation. He now becomes assistant to the president, as above noted, having, in addition to his duties pertaining to federal valuation, such other duties as may be assigned.

Albert Hall Harris, general counsel of the New York Central Lines East of Buffalo, N. Y., and vice-president of the New York Central Lines West of Buffalo, with office at New York, has been appointed vice-president of the consolidated company, the New York Central Railroad, with headquarters at New York; he also retains the vice-presidency of those lines west of

Buffalo, which are not affected by the consolidation. Mr. Harris was born on July 4, 1861, at Rochester, N. Y., and graduated from the University of Rochester in 1881, with the degree of A.B. In April, 1905, he was appointed general attorney of the New York Central & Hudson River, and since December, 1906, has been general counsel. In December, 1906, he was appointed also vice-president of the Michigan Central; the Lake Shore & Michigan Southern; the Cleveland, Cincinnati, Chicago & St. Louis; the Lake Erie & Western, and the Pittsburgh & Lake Erie.

Operating

E. V. Brogan, assistant division superintendent of the Lake Shore & Michigan Southern at Buffalo, N. Y., has been appointed assistant superintendent of the Buffalo division of the New York Central Railroad.

F. M. Thomson, assistant engineer of the Houston & Texas Central at Ennis, Tex., has been appointed assistant superintendent of the El Paso division at El Paso, Tex., of the Galveston, Harrisburg & San Antonio, succeeding C. R. Morrill, promoted.

C. R. Morrill, assistant superintendent of the El Paso division of the Galveston, Harrisburg & San Antonio at El Paso, Tex., has been appointed superintendent of the Second division of the Houston & Texas Central, with office at Austin, Tex., succeeding W. L. Bisbee, resigned on account of ill health.

R. N. Hudson having resigned to accept service with another company, the office of general manager at Versailles, Ky., of the Louisville & Atlantic, a subsidiary of the Louisville & Nashville, is discontinued, and all duties heretofore assigned to that office will, in future be performed by J. R. Pates, superintendent, at Richmond, Ky.

W. A. Mather, superintendent of the Alberta division of the Canadian Pacific at Kenora, Ont., has been appointed superintendent, with office at Medicine Hat, in place of J. M. Cameron, promoted, and J. N. Murphy has been appointed trainmaster, with headquarters at Medicine Hat, in place of A. F. Hawkins.

J. L. McCollum, superintendent of the Atlanta division of the Nashville, Chattanooga & St. Louis, at Atlanta, Ga., has been appointed general agent of the operating department; J. A. Baldwin, assistant superintendent at Atlanta has been appointed acting superintendent, and J. Q. Bowden has been appointed assistant superintendent, all with headquarters at Atlanta.

Arthur Hatton, superintendent of car service of the Canadian Pacific at Winnipeg, Man., has been appointed general superintendent of car service, with office at Montreal, Que., in place of George S. Cantlie, who, at his own request, has been granted leave of absence for an extended period, in order that he may take command of the Montreal unit to be organized for service with the third contingent of the Canadian expeditionary force.

The following officers of the Lake Shore & Michigan Southern, which is now consolidated with the New York Central Railroad, have had their jurisdiction extended over the Illinois division of the New York Central, formerly the Chicago, Indiana & Southern; F. H. Wilson, general superintendent, Chicago; H. J. Merrick, superintendent of freight transportation, Cleveland, Ohio; S. T. Gage, superintendent of passenger transportation, Cleveland, and F. F. Riefel, superintendent of telegraph, Cleveland.

J. M. Daly has resigned as general superintendent of transportation of the Illinois Central and the Yazoo & Mississippi Valley, to engage in other business. J. F. Porterfield, general superintendent of the lines south of the Ohio river at New Orleans, La., succeeds Mr. Daly; L. W. Baldwin, superintendent of the Kentucky division, succeeds Mr. Porterfield; L. A. Downs, superintendent of the Minnesota division, succeeds Mr. Baldwin at Louisville, Ky.; William Atwill, trainmaster of the Minnesota division, at Dubuque, Iowa, succeeds Mr. Downs at Dubuque; H. G. Duckwitz succeeds Mr. Atwill; J. M. O'Day, superintendent of transportation, has been appointed car accountant, and will report to the controller at Chicago.

B. B. Greer, whose appointment as assistant general manager of the Chicago, Burlington & Quincy lines east of the Missouri river, has already been announced in these columns, was born in Chicago in 1877. He attended Armour Institute 1893-97 and Dartmouth College 1897-98. He began railway work in 1899 with the Great Northern, and remained with that road until 1908, filling

various positions, including roadmaster's clerk, chief clerk to superintendent, roadmaster and assistant superintendent. Mr. Greer then became connected with the Chicago, Burlington & Quincy as transportation inspector on the general manager's staff, and has since been consecutively superintendent of terminals at St. Louis, Mo., division superintendent at Hannibal and St. Joseph, and assistant to the general manager of the lines east of the Missouri river. From the latter position he was on January 1 promoted to assistant general manager, with headquarters at Chicago, as above noted.

Edward J. Guthrie, whose appointment as superintendent of the Southern division of the Central Vermont, also as superintendent of the Central Vermont Transportation Company, with headquarters at New London, Conn., has already been announced in these columns, was born on March 1, 1866, at Erie, Ont., Canada, and was educated in the country schools of western Ontario. He began railway work on October 1, 1889, with the Grand Trunk as a switchman, remaining in that position for a year and a half. He was then telegraph operator for nine years; agent at various places on the Grand Trunk for nine and one-half years, and in 1907 entered the service of the Central Vermont as freight agent at St. Albans, Vt.

Three months later he was transferred to Palmer, Mass., and subsequently served at Brattleboro, Vt. He was then appointed general agent of the same road at New London, Conn., four months later he was transferred to New York as agent of pier 29, East river, and now becomes superintendent of the Southern division of the same road, also superintendent of the Central Vermont Transportation Company, in charge of steamers operating between New London and New York, with headquarters at New London, Conn.

Traffic

William Warner has been appointed general agent of the San Pedro, Los Angeles & Salt Lake at Chicago, succeeding George M. Sargent, deceased.

R. L. McKibben has been appointed general baggage agent of the Sunset-Central Lines, with headquarters at Houston, Tex., succeeding W. S. Napier, deceased.

Albert K. Curtis has been appointed district passenger agent of the Union Pacific at Des Moines, Iowa, vice J. W. Turtle, traveling passenger agent, deceased. William R. Alexander has been appointed general agent at Detroit, Mich., succeeding J. C. Ferguson, resigned.

W. H. Cundey, general agent, passenger department, of the Denver & Rio Grande, the Western Pacific, the Missouri Pacific and the St. Louis, Iron Mountain & Southern, at Colorado Springs, Colo., has been appointed assistant general passenger agent, with headquarters at Denver, Colo. A. C. Wilson, commercial freight agent at Colorado Springs, has been appointed general agent at that place.

B. H. Hartley, commercial agent of the Seaboard Air Line, at Atlanta, Ga., has been appointed general agent of the Seaboard Air Line and the Carolina, Atlantic & Western, with office at Charleston, S. C., in charge of freight and passenger traffic in Charleston territory, and D. P. Hartley has been appointed commercial agent of both roads, with office at Charleston, S. C. J. F. Cheney has been appointed commercial agent of the Seaboard Air Line, with office at Atlanta, Ga., succeeding B. H. Hartley. W. A. Fulwiler, commercial agent at Oklahoma City, Okla., has been appointed general agent at Tampa, Fla., in charge of freight and passenger interests at Tampa and at



E. J. Guthrie

points in the Tampa territory, and J. T. Baird has been appointed commercial agent, with office at Oklahoma City, Okla., succeeding Mr. Fulwiler.

Engineering and Rolling Stock

J. P. Dolan has been appointed master mechanic of the Apalachicola Northern, with office at Port St. Joe, Fla., succeeding R. A. Billingham.

W. Malthaner has been appointed master mechanic of the Baltimore & Ohio, with headquarters at Newark, Ohio, succeeding O. J. Kelley, assigned to other duties.

F. G. White has resigned as signal engineer of the Chicago Great Western, and the duties of that office have been assumed by G. O. Perkins, superintendent of telegraph, with headquarters at Chicago.

Frank W. Taylor, division master mechanic of the Illinois Central at Waterloo, Iowa, has been appointed superintendent of machinery of the International & Great Northern, with headquarters at Palestine, Tex., succeeding C. H. Seabrook, resigned.

Joseph Keller has been appointed to the new position of general fuel inspector of the Lehigh Valley, with office at South Bethlehem, Pa. Mr. Keller was previously a member of the board of examiners for enginemen on the Lehigh Valley at South Bethlehem.

The following officers of the Lake Shore & Michigan Southern, which is now consolidated with the New York Central Railroad, have had their jurisdiction extended over the Illinois division of the New York Central, formerly the Chicago, Indiana & Southern. D. R. MacBain, superintendent of motive power, Cleveland, Ohio; G. C. Cleveland, chief engineer, Cleveland.

F. J. Barry, general inspector of air brakes, steam heat and lighting of the New York, Ontario & Western, with office at Middletown, N. Y., has been appointed master mechanic, with office at Mayfield Yard, Pa., vice W. H. Kinney, resigned, and his former position has been discontinued. Matters relative to steam heat and lighting will in future be in charge of A. Kipp, general car inspector, and matters relative to air brakes will be in charge of B. P. Flory, superintendent of motive power.

E. Ben Carter, whose appointment as chief engineer of the Florida East Coast, with headquarters at St. Augustine, Fla., has already been announced in these columns, was born on June 11, 1853, at Branford, Conn. After leaving high school he was a student at an academy and then took up special engineering studies. He began railway work in June, 1871, with an engineering corps making surveys for the Chicago, Decatur & St. Louis, and subsequently was engaged in making miscellaneous surveys and in construction work in Illinois, Wisconsin, Michigan, Nebraska and Missouri on the Kansas City extension of the Chicago & Alton, also in Ohio. From 1881 to 1887 he was locating and construction engineer of the Jacksonville, Tampa & Key West, now a part of the Atlantic Coast Line on the Jacksonville-Tampa division. From 1887 to 1892 he was engaged in miscellaneous engineering work in Florida, and since that time has been in the service of the Florida East Coast; for two years as division engineer on construction until April, 1894, then engineer and general roadmaster until January, 1909, and as superintendent of maintenance of way until January, 1915, when he was appointed chief engineer of the same road. From 1894 to 1915 Mr. Carter performed the duties of chief engineer.

Special

E. E. Pettibone, real estate agent of the Lake Shore & Michigan Southern, which is now consolidated with the New York Central, has had his jurisdiction extended over the Illinois division of the New York Central, formerly the Chicago, Indiana & Southern.

Purchasing

E. G. Goodwin has been appointed fuel agent of the Southern Railway, the Virginia & Southwestern and the Northern Alabama, with headquarters at Knoxville, Tenn., and subsidiary offices at Birmingham, Ala., and Princeton, Ind.

The following officers of the Lake Shore & Michigan Southern, which is now a part of the New York Central Railroad, have had their jurisdiction extended over the Illinois division of the New York Central, formerly the Chicago, Indiana & Southern. G. R.

Ingersoll, purchasing agent, Cleveland, Ohio; J. P. Murphy, general storekeeper, Cleveland.

OBITUARY

Samuel M. Inman, formerly a director of the Southern Railway, died on January 12, at Atlanta, Ga.

Edmund P. Henderson, formerly a master mechanic of the Southern Pacific, died at San Antonio, Tex., on January 4, aged 75 years.

Chauncey Ives, formerly chief engineer of the Cumberland Valley Railroad, and later engaged in construction work on the tunnels in New York City, died on January 4, at Hood River, Ore.

A. B. Hinkle, assistant to division engineer of the Chicago division of the Baltimore & Ohio, died at his home in Albion, Ind., on January 2. Mr. Hinkle had been continuously in the service of the B. & O. since 1885.

William J. Young, formerly for many years commercial agent of the Illinois Central at Chicago, died at his residence in Evans-ton on January 11, aged 73 years. He was retired three years ago under the pension rules of the Illinois Central, having reached the age of 70 years.

Sidney B. Liggett, secretary of the Pennsylvania Lines West of Pittsburgh, died on January 9 at his home in Pittsburgh, Pa., at the age of 65. He entered the services of the Pennsylvania company in 1871, as a clerk in the auditor's office, and since February, 1881, was secretary of the Pennsylvania Lines West of Pittsburgh.

Alphonse Feldpauche, who was formerly chief engineer of the Philadelphia, Wilmington & Baltimore, and later secretary of the Association of Transportation Officers of the Pennsylvania Railroad, died on January 5, at Philadelphia, Pa., at the age of 66. Mr. Feldpauche remained in charge of the engineering department of the P. W. & B. for some years after the road came under the control of the Pennsylvania. He was appointed secretary of the transportation officers' association in 1903.

Joseph McCabe, formerly from February, 1898, to June, 1906, vice-president and general manager of the Washington & Columbia River, now a part of the Northern Pacific, died recently at the age of 59. He began railway work in 1870 with the Chicago, Milwaukee & St. Paul, and was consecutively telegraph operator and agent on that road. He subsequently served as train despatcher and chief train despatcher on different roads, until 1888, when he was appointed superintendent on the Northern Pacific, and in February, 1898, he became vice-president and general manager of the Washington & Columbia River.

Thomas C. Keefer, one of the most prominent civil engineers of Canada, died at his home in Ottawa, January 7, at the age of 94. He commenced his career as an engineer at the age of 17 on the Erie canal. He was engaged for several years on the Welland canal, and had a prominent part in the improvement of the Ottawa and St. Lawrence rivers. He took part in the preliminary surveys for the Grand Trunk between Montreal and Toronto, and in the preparation of plans for the Victoria bridge at Montreal. Besides being an eminent engineer, he was a capable writer, and his "Philosophy of Railways," published in 1849, had a marked influence on the policy of the Canadian government. He had been a president of the American Society of Civil Engineers, and was one of the founders of the Canadian Society of Engineers in 1887.

Christopher S. Gadsden, second vice-president of the Atlantic Coast Line, with headquarters at Charleston, S. C., died at Summerville, S. C., on January 12. He was born on August 15, 1834, at Summerville, and was educated at the South Carolina Military Academy. He began railway work in 1853, as rodman in an engineer corps of the New Orleans & Great Northern, now a part of the Illinois Central. He was subsequently engineer on the Franklin & Warren, now a part of the Erie, and later was in the service of the Port Royal & Augusta, in South Carolina, now a part of the Charleston & Western Carolina, and of the Charleston & Savannah. He was superintendent of the Charleston & Savannah until October, 1900, when he became president of the same road. Mr. Gadsden was also third vice-president of the Atlantic Coast Line to November, 1902, and since that time was second vice-president of that road.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has ordered 5 Pacific type locomotives from the American Locomotive Company.

CAR BUILDING

THE MATHER STOCK CAR COMPANY has ordered 500 stock cars from the Haskell & Barker Car Company.

THE CHICAGO & MILWAUKEE ELECTRIC is in the market for 15 all-steel passenger cars instead of 300 as reported last week.

THE LONG ISLAND has ordered 20 steel passenger cars from the Standard Steel Car Company, for use on its Atlantic Avenue division.

THE INTERBOROUGH RAPID TRANSIT has ordered 12 all-steel passenger cars from the Pressed Steel Car Company for operation in the Steinway tunnel.

IRON AND STEEL

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has ordered 3,000 tons of steel rails from the Tennessee Coal, Iron & Railroad Company, for use in the improvement of the roadway of the Western & Atlantic.

THE KHEDIVE AND THE MARIOUT RAILWAY.—It is stated that one of the last efforts of the ex-Khedive was an attempt to sell, to an Italo-German syndicate, his private railway through the Mariout district, with the intention that it should be connected up with a new line from Benghazi on the Tripolitan coast. There would thus have been direct railway communication with Alexandria, and it was the hope of the promoters that the Indian and Australasian mails would be sent by this route because the distance by sea from Brindisi to Benghazi is a little more than half that from the former port to Alexandria, while it was also believed that tourists would take advantage of the saving of time in the journey between Europe and Egypt. Lord Kitchener, however, strongly opposed the scheme, and the Mariout Railway was bought by the Egyptian government, chiefly in consequence of military considerations.

INDIAN RAILWAY OPERATION.—A narrow-gauge line about 30 miles in length, from Broach to Jambusar, has recently been opened for passenger traffic, and is now incorporated in the Bombay, Baroda, and Central India system. At the close of March the South Indian Railway was operating 1,753 miles of line, viz.: broad gauge, 446 miles; metre gauge, 909 miles; narrow gauge, 99 miles; and meter-gauge lines, other than state lines, 299 miles. A connection established between India and Ceylon by the South Indian Company is now in operation. A viaduct establishes communication between the mainland of India and the Island of Rameswaram, and a Scherzer rolling-lift bridge carries trains over the Pamban Pass. Passenger traffic over the new lines is now in full operation, but there has been some delay as regards goods traffic, and the Ceylon government still restricts despatches to three days a week, and refuses altogether the carriage of live stock. In consequence of a heavy and abnormal fall of rain, the main line of the meter-gauge section was recently washed away between Capper Quarry and Coleroon. The normal rainfall of the district is about 49 in. per annum, but in one month alone rain fell to the extent of 41 in., of which 25 in. fell in 48 hours. The consequence was that numerous canals and tanks burst their banks, and all the rivers, of which there are four in the district affected, overflowed their banks. The railway was breached almost continuously for 10 miles; none of the bridges was seriously damaged, and only one culvert was carried away. The damage, however, was so extensive that all traffic over the 10 miles had to be suspended for a month, and the restoration of communications cost nearly \$33,500.—*Engineering*.

Supply Trade News

Benjamin G. Fernald has been appointed district manager of the New York office of the Kerr Turbine Company, Wellsville, N. Y.

R. M. Nicholson, advertising manager of the Kimberly-Clark Paper Company, Neenah, Wis., has been placed in charge of the advertising of the Berger Manufacturing Company, Canton, Ohio, succeeding G. P. Blackiston.

C. P. Howard, formerly a member of the firm of Berry, Howard & Roberts, which was recently dissolved, announces the opening of an office as consulting engineer in the Transportation building, Chicago. He will specialize in railway work.

The item in this column last week announcing the incorporation of the National Brass Company, Houston, Tex., was incorrect in that it omitted to state that the G. F. Cotter Supply Company, Houston, Tex., had been appointed general sales agents for the National Brass Company.

The Beaver Dam Malleable Iron Company has been reorganized and incorporated under the corporate name of the Western Malleable Company, and continues the operation of the plant at Beaver Dam, Wis. The officers are: Lawrence Fitch, president and treasurer, with headquarters at Milwaukee, Wis.; E. E. Smythe, vice-president and general manager; M. A. Jacobs, secretary, and A. W. Wilbrandt, assistant secretary.

In a recent decision handed down by the Honorable Learned Hand, justice of the United States district court of the southern district of New York, in the suit of the Chadeloid Chemical Company, New York, against the Wilson Remover Company and John MacNaul Wilson, it is held that the varnish remover made by the defendant company is an infringement of Ellis patent No. 714,880, controlled by the Chadeloid Chemical Company.

Joseph T. Ryerson & Son, Chicago, are offering a prize of \$100 in gold for the best trade name for the line of tool steel which the company is selling. The company has been selling a complete line of tool steel for many years, but has had an outside manufacturing connection for the steel, and in consequence adopted the name used by the manufacturer. It has since been found necessary to either manufacture or control the manufacture of the steel, which the company has now been doing for some time. In addition to the \$100 first prize, those who send in the 100 next best names will be given a copy of a loose-leaf leather reference book of steel and engineering data, and for the next best 200 names bound volumes of the same book will be given.

Charles Silverman Price, for many years general manager of the Cambria Steel Company, and later its president, died at his home at Westmont, Pa., on Sunday, January 10, of heart disease. Mr. Price was born at West Chester, Pa., on August 27, 1852. He was educated in the private schools and received the degree of Bachelor of Civil Engineering from Cornell University in 1872. After graduating from college he was first employed by the Detroit Bridge & Iron Works, Detroit, Mich., as a draftsman. Shortly after, he was elected city engineer of Lock Haven, Pa., serving for three years. In June, 1876, he entered the service of the Cambria Iron Company as a draftsman in the engineering department. He supervised the construction of the first open-hearth plant of the company, and after its completion became turn foreman, serving as such from 1878 to 1881. He was promoted successively to the positions of superintendent of the open-hearth works, 1881-84; superintendent of the Bessemer, open-hearth and blooming departments, 1884-86; superintendent of the metallurgical department, 1886-90, and general superintendent of manufacture, 1890-92. He subsequently became general manager, vice-president, and on March 15, 1910, was elected president of the Cambria Steel Company. He remained in that position until September 26, 1912, when he resigned on account of ill health.

A decision has just been rendered by the United States Circuit Court of Appeals for the Seventh circuit in the suit of The Rail-

road Supply Company versus the Hart Steel Company and Guilford S. Wood, appealed from the United States District Court for the Northern district of Illinois, Eastern division, reversing the decision of the District Court and deciding in favor of The Railroad Supply Company. This case has been stubbornly contested in the courts for six years and has attracted a great deal of attention because of the principles at issue. The suit involved the validity of three patents covering the designs of tie plates issued to B. Wolhaupter in 1895, 1902 and 1903 and assigned to The Railroad Supply Company, the essential features of these patents being combined in the design of one tie plate. The claims outlined in the patents cover a railway tie plate with flanges more or less sharpened on the under side to penetrate and engage the wood fibres of the tie and with a series of corrugations on the upper surface supporting the rail. This design not only provides a bond between the tie plate and the tie, but the corrugations on the upper surface give increased strength for the amount of metal employed. The evidence introduced in this case showed that the merits of this design have been recognized by many railroads as indicated by the fact that they are being used in large quantities. In sustaining the validity of these patents this decision of the Circuit Court of Appeals ordered an accounting on the claims of the first and primary patent and ordered an injunction and an accounting on the second and third patents containing supplementary features of design later included in this tie plate. This decision is of special importance to the railway supply field, establishing as it does a further precedent for the sustaining of the validity of patent claims against infringements.

TRADE PUBLICATIONS

FORGING PRESSES.—The Mesta Machine Company, Pittsburgh, Pa., has issued bulletin L, descriptive of the Mesta quick-acting, steam-hydraulic flanging press, with single lever control.

ASBESTOSTEEL.—The Asbestos Protected Metal Company, Beaver Falls, Pa., recently issued bulletin No. 54, a 32-page booklet, devoted to a description and illustrations of the use of Asbestosteel for roofs and walls. It gives in detail the uses to which this product may be put and the method of application, also specifications for roofing, slabs, etc., and tables showing safe loads in lb. per sq. in., and sizes of purlins required for various spans. The illustrations show typical cases where the material has been used.

THE STORY OF LA CARTE.—This is the title of an attractively illustrated booklet recently issued by the passenger department of the United Fruit Company to indicate the excellencies of the à la carte dining service on the steamships Pastores, Tanadores and Calamares of the Great White Fleet. The booklet contains several varicolored views of ships of various ages. It also gives a brief outline of the methods of supplying food to those "who went down to the sea in ships" from early times to this, the story being supplemented with interesting items relating to a number of famous dinners on sea and land.

BOILER CIRCULATION.—The Q & C Company, New York, has recently issued a catalog descriptive of the Ross-Schofield System of Circulation for Locomotive Boilers. The bulletin is gotten up in a very attractive manner and on the whole is somewhat out of the ordinary, it being illustrated with both photographs and colored engravings. This system, formerly controlled by the Ross-Schofield Company, has recently been taken over by the Q & C Company. It has been installed on stationary boilers on the Philadelphia & Reading, as well as on locomotive boilers on that road and on the New York, Ontario & Western. A full description of the system was given in the *Railway Age Gazette* of December 18, 1914, page 1131.

ELECTRIC APPLIANCES.—The General Electric Company has recently issued the following bulletins descriptive of some of its electrical appliances. Bulletin No. 42,010, entitled "Small Turbo-Generator Sets," 7 kw. to 300 kw., illustrates and describes in considerable detail the horizontal turbine sets of small capacities manufactured by the company. These machines are largely used for supplying light and power in mills, machine shops and other places, as well as for train lighting. Bulletin No. 42,300 describes the General Electric Company's line of small direct connected generating sets of sizes ranging from 2½ kw. to 75 kw. Bulletin No. 45,602 deals with the subject of the protection of series lighting circuits by lightning arresters.

Railway Construction

ALBERTA CENTRAL.—See Canadian Pacific.

BLACK MOUNTAIN & EASTERN.—We are told that under this name a logging road is being built from Combs in Madison county, Ark., south to Cass in Franklin county, 18 miles. The line is being built for the Phipps Lumber Company, Fayetteville, and 16 miles of track has been laid. The general contract has been given to the Burke Construction Company, Fort Smith. (March 27, p. 767.)

CANADIAN PACIFIC.—The Alberta Central has asked the Canadian Parliament for an extension of time to build lines as follows: from Rocky Mountain House, Alta., to the Grand Trunk Pacific, near Yellow Head Pass, also for three branch lines of 30 miles each, and two branch lines of 35 miles each, to be built into the Big Horse range and along the Brazeau river. (September 25, p. 587.)

The Kootenay Central, which is operated as the Kootenay Central Sub-division of the Canadian Pacific, has completed the section between Edgewater, B. C., and Fort Steele, and the line is now in operation from Golden to Colvalli, 166.7 miles, where a junction is made with the main line of the Crownsnest route. Additional second track was opened for operation in December, 1914, between mileage 0.4 and 24.8 on the Shuswap-sub-division between Revelstoke, B. C., and Taft, making the double track mileage of the British Columbia division 139 miles.

CAROLINA, GREENVILLE & NORTHERN (Electric).—This company plans to build about 75 miles of railway, it is said, from Newport, Tenn., northeast via Greenville to Kingsport. There are to be three bridges on the line. Bids for the work will probably be asked for about May 1. H. S. Reed, president, Los Angeles, Cal.; J. L. Callanan, vice-president, New York; E. R. Eaton, treasurer, Greenville, Tenn., and F. A. H. Kelly, chief engineer, Greenville.

FLORIDA ROADS.—According to press reports a railway is to be built from Green Cove Springs, Fla., on the Atlantic Coast Line west across Clay county to Starke on the Seaboard Air Line in Bradford county, about 30 miles. The Dowling-Shands Lumber Company, Green Cove Springs, is said to be interested.

ILLINOIS CENTRAL.—The construction of the 2.6 miles of spur track extending south from Oak Ridge, Ill., and serving the Peabody Coal Company, has been completed.

KANSAS & OKLAHOMA SOUTHERN.—Financial arrangements are being made for the completion of the 61-mile extension from Caney, Kan., to Vinita, Okla. It is planned to resume construction work about April 1, 1915.

KOOTENAY CENTRAL.—See Canadian Pacific.

LULA HOMER.—This company, which was recently organized in Georgia to build from Lula, Ga., southeast to Homer, about 14 miles, has plans about completed, it is said, and construction work will be started at once. D. G. Zeigler & Sons, Lula, may be addressed. (November 27, p. 1029.)

MARIETTA-PARKERSBURG INTERURBAN.—Application has been made for a charter in West Virginia, it is said, by this company, with a capital of \$10,000. The plans call for building an electric line from Parkersburg, W. Va., north to Marietta, Ohio, about ten miles. J. Kaiser and M. M. Rose, Marietta; K. B. Stephenson and H. H. Archer, Parkersburg, W. Va., are interested.

MASSACHUSETTS ROADS.—The Walworth Manufacturing Company has asked for authority to build two miles of railway along the South Boston (Mass.) waterfront from the freight yards of the New York, New Haven & Hartford on West First street, through that street to a point between F street and Dorchester street, thence along East First street to Marine Park.

MONROE & TEXAS.—Incorporated in Louisiana with a capital of \$40,000, it is said, to build or lease a railroad from Monroe, La., southwest through Ouachita, Jackson, Winn, Natchitoches and Sabine parishes to a point on Sabine river, about 125 miles.

Authority is also given to build branch lines and to extend the railroad outside of Louisiana. F. R. Pierce, president, St. Louis, Mo.; L. Brandt, vice-president; C. S. Chesbro, secretary; and A. B. Pierce, treasurer.

MONTANA WAUMANDEE.—Surveys are being made for the proposed line which is to extend from a point on the Chicago, Burlington & Quincy, through Waumandee, Wis., to Montana, Buffalo county, Wis. The exact route has not yet been determined and no contracts for construction have been let. A few small pile trestles will be required. A charter was granted this company November 13, 1914. H. G. Hawley, Waumandee, Wis., is chief engineer.

MONTREAL & SOUTHERN COUNTIES (Electric).—This company has asked the Canadian Parliament for an extension of time in which to build from Montreal, Que., via St. Lambert to Granby and other points south of the St. Lawrence river. The line is now in operation from Montreal to St. Cesaire, 35 miles, and construction work is now under way between St. Cesaire and Granby, 15 miles. (July 3, p. 39.)

PALM BEACH & EVERGLADE.—Under this name a company has applied for a charter in Florida to build a railway from Palm Beach, Fla., west to Lake Okeechobee, about 45 miles. The projected route is along the West Palm Beach canal for some distance, thence southwest to Lake Okeechobee. The line may eventually be extended to a point on the west coast of Florida. C. H. Baker, president, New York; H. G. Geer, vice-president; J. A. Moore, general manager; W. H. De Camara, secretary, and T. J. Campbell, treasurer, West Palm Beach, Fla.

TENNESSEE ROADS (Electric).—Plans are being made, it is said, to build an electric line from Knoxville, Tenn., northeast via Newport to Bristol, about 120 miles. M. K. Bell, Knoxville, represents eastern capitalists who are interested in the project. Some of the right of way has been secured. S. E. Hodges, Knoxville, is the attorney.

RAILWAY STRUCTURES

BUFFALO, N. Y.—The city officers of Buffalo have approved the contract entered into between the city of Buffalo and the Lehigh Valley for the construction of this railway's new terminal in Buffalo. This removes the last obstacle to the carrying out of this improvement. The railway company is now preparing the specifications for the new terminal. (July 17, p. 148.)

CAMDEN, N. J.—An officer of the Atlantic City Railroad writes that the company has not yet decided on the plans for a new terminal to be built at Camden to replace the structure which was recently destroyed by fire.

CONNERSVILLE, IND.—The Cincinnati, Hamilton & Dayton has just completed a \$12,000 brick passenger station at Connersville.

GALVESTON, TEX.—The grain elevator of the Southern Pacific Terminal Company at Galveston, Tex., which was destroyed by fire November 17, will be replaced by a new elevator of reinforced concrete construction, and supported on a concrete mattress over piling. The work house will be 98 ft. long and 47 ft. wide, with a capacity of 212,000 bu., and will be equipped with the most modern grain handling facilities. The storage annex will consist of 48 bins, 15 ft. inside diameter and 98 ft. high. The total capacity of work house and storage annex will be 1,004,000 bu.

MICHIGAN CITY, IND.—The Michigan Central is preparing plans for a new station at Michigan City, to replace the one recently destroyed by fire.

SPRINGFIELD, ILL.—A committee consisting of representatives of the various railroads entering Springfield, Ill., with H. T. Douglas, Jr., chief engineer of the Chicago & Alton as chairman, has been formed and is now making a study of the railroad situation at Springfield. The separation of grades and a union station have been proposed by the Springfield Commerce Association as a means of improving the situation. A belt line has also been suggested. The committee has drawn up some preliminary plans, but as yet nothing definite has been decided upon.

VIRGINIA, NEB.—The Chicago, Rock Island & Pacific, it is said, will build a new station at Virginia, Neb., at once to replace the one destroyed by fire on December 23.

Railway Financial News

BUCKHANNON & NORTHERN.—See Monongahela Railroad.

CHICAGO, MILWAUKEE & ST. PAUL.—The Railroad Commission of Wisconsin has approved of the issue of \$29,141,300 additional stock to provide for conversion at par of a like amount of convertible bonds which the directors have authorized, as recently announced in these columns.

KANSAS CITY, OZARK & SOUTHERN.—F. C. Braden, of St. Louis, has been appointed receiver of the Kansas City, Ozark & Southern on the application of two officers of the company. The road runs from Ava, Mo., to Mansfield, 16 miles.

MONONGAHELA RAILROAD.—Stockholders have approved a consolidation with the Buckhannon & Northern.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This company has declared a semi-annual dividend of 2½ per cent, payable February 1. This reduces the annual rate from 7 per cent to 5 per cent.

NATIONAL RAILWAYS OF MEXICO.—A special general meeting of stockholders has been called for February 20 at the offices of the company in Mexico City.

SOUTHERN RAILWAY.—The last payment was made on January 4 by the Southern Railway to the state of Georgia for the line which runs from Athens to Lula. The state had guaranteed the bonds of the old Northeastern Railway Company, which originally built the line, and the state came into possession of the road through its inability to earn its fixed charges and sold it to the Southern Railway for \$307,000, payments being made \$50,000 annually.

PEAT USED AS INSULATING MATERIAL ON THE BERLIN ELEVATED.—The construction of the Berlin elevated railway, which in places had to pass through blocks of houses, necessitated the use of sound insulating material, and several experiments proved that compressed peat-litter possessed exceptionally good qualities for this purpose. It was applied in plates 1 in. thick, weighing 1.3 lb. to 2.5 lb. a sq. ft., according to the degree of compression (the more firmly compressed, the more efficient it is). As such peat plates can withstand a pressure of from 280 lb. to 1,400 lb. per sq. in., according to the method by which they have been made, they are also suitable as sub-layers for asphalt in gateways, for linoleum, and even for machinery foundations, and can be used to reduce expensive cork plates (peat plates cost barely 50 cents per square yard). These plates have also proved most efficient insulation material for heat and cold. The plates are protected against damp and insects by means of molten asphalt, which is used for attaching them to each other.—*Engineering.*

NEW ELECTRIC RAILWAY FOR BOLIVIA.—The representation from the Department of La Paz to the Bolivian Chamber of Deputies has submitted to the consideration of that body a project for the construction of an electrical railway from the city of La Paz to the Yungas district of the department. The project has been reported on favorably by the committee on highways and finance, and it appears as though it would be voted on favorably by a large majority. The district through which the proposed line is to pass is probably the richest agricultural part of the department of La Paz under actual cultivation, producing very large quantities of coca-leaves, fine woods, coffee, cocoa, sugar cane and many other valuable crops, besides being wealthy in minerals. The roads leading from La Paz to the district are good and the territory, which will be served by the railway, is well provided with large amounts of water power. The maximum cost of the line is calculated at \$2,500,000 United States currency. The work is to be directed by the Public Works Department of the Bolivian government, its cost being defrayed from the treasury of the Department of La Paz. Surveys have been made by the Bolivia Railway and by the public works office, and the work is to be carried out in accordance with their surveys and plans.